Fourth Five-Year Review Report

for

Medley Farm Drum Dump Superfund Site
SCD980558142

Gaffney, Cherokee County, South Carolina

September 2014

United States Environmental Protection Agency
Region 4
Atlanta, Georgia

Approved by: Date:

9/1/14

Randall Chaffins, Acting Director
Superfund Division

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ARAR	Applicable or Relevant and Appropriate Requirement
AROD	Amended Record of Decision
BRA	Baseline Risk Assessment
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act (1980), as
CD	Consent Decree
CIC	Community Involvement Coordinator
COC	Contaminant of Concern
CSF	Cancer Slope Factor
DP	Dual Phase
EPA	United States Environmental Protection Agency
ESD	Explanation of Significant Difference
HI	Hazard Index
IC	Institutional Control
IRIS	Integrated Risk Information System
MCL	Maximum Contaminant Level
MNA	Monitored Natural Attenuation
NCP	National Contingency Plan
NPDES	National Pollution Discharge Elimination System
NPL	National Priorities List
O&M	Operation and Maintenance
OSWER	Office of Solid Waste and Emergency Response
PRP	Potentially Responsible Party
PSVP	Performance Standards Verification Plan
QAPP	Quality Assurance Project Plan
RA	Remedial Action
RAO	Remedial Action Objective
RD	Remedial Design
RG	Remedial Goal
RI FS	Remedial Investigation Feasibility Study
ROD	Record of Decision
RPM	Remedial Project Manager
SCDHEC	South Carolina Department of Health and Environmental Control
TMM	Technical Maximization Measures
UIC	Underground Injection Control
VOC	Volatile Organic Compound

Executive Summary

The Medley Farm Drum Dump Site (Site) is located on a 62-acre tract of land located in a primarily rural agricultural area, approximately 6 miles south of Gaffney, Cherokee County, South Carolina. The street address of the Medley home and the entrance of the main Site access road is 887 Burnt Gin Road. Primary land use near the Site is agricultural and light residential. The Site was a mixture of pasture and woodlands prior to being operated as a dump. From 1966 to 1976 the Site was used for the disposal of chemical wastes in drums and other containers from area textile, paint, and chemical manufacturing firms.

In 1983, a local citizen witnessed the disposal of barrels on the Medley property. In May 1983 the South Carolina Department of Health and Environmental Control (SCDHEC) took samples onsite, and notified EPA that the disposal of industrial wastes was occurring at the Site, with leaking drums present. The EPA initiated a removal action on June 20, 1983. More than 5,300 55-gallon drums and 15-gallon containers were removed from the Site. Approximately 24,000 gallons of liquids from the drummed waste were taken off-Site by tanker truck and incinerated. Some 2,100 cubic yards of solid waste and contaminated soils were taken to an approved hazardous waste landfill. About 70,000 gallons of water were drained from six small lagoons and transported offsite for proper disposal.

Following completion of the 1983 removal action, a series of Site investigations were conducted to characterize the nature and extent of contaminants of concern (COCs) present within the soil, groundwater, surface water, and sediment. The EPA completed enforcement activities necessary to propose the Site to the National Priorities List (NPL) between 1984 and 1987. The EPA proposed the Site for inclusion on the NPL in June 1986. Final NPL listing was completed in March 1990. The basis for NPL listing was a Hazardous Ranking System score of 31.58, which is above the 28.5 threshold that makes a Site eligible for the NPL.

In January 1988, five PRPs signed an Administrative Order of Consent with EPA, under which they agreed to conduct a Remedial Investigation Feasibility Study (RI FS) for the Site. Sirrine Environmental Consultants completed the RI FS in early 1991. The RI FS determined that Site soil was contaminated with VOCs in three primary areas, and groundwater was contaminated with VOCs. The RI and FS Reports were used by the EPA to develop the May 1991 Record of Decision (ROD).

Following issuance of the 1991 ROD, the PRPs initiated remedial design (RD) and remedial action (RA) activities. Remediation has been ongoing at the Site since 1995, resulting in significant reduction of the observed extent of COCs in the soil and groundwater of the Site. From 1991 through 2004, the primary treatment methods employed were groundwater pump-and-treat and soil vapor extraction (SVE).

Due the successful removal of COCs in the soil, the SVE operations ceased in 2004. Also in 2004, due to greatly decreased effectiveness of the groundwater pump-and-treat system in diminishing levels of COCs in the groundwater, the system was shut down in order to initiate a technical maximization measure involving enhanced reductive dechlorination (ERD). ERD treatment activities at the Site are currently ongoing. As a result of the observed success of the ERD, the 1991 ROD was amended in August 2012. The Amended Record of Decision (AROD) changed the Site remedy from groundwater pump-and-treat for groundwater and SVE for soil, to ERD for groundwater, with Monitored Natural Attenuation (MNA) as a contingency remedy.

EPA completed the Third Five-Year Review in September 2009. Five issues were identified, of which four were judged capable of affecting future remedy protectiveness. The main issues were the revision and approval of an updated Quality Assurance Project Plan and the modification of the Site remedy to consider ERD and other feasible cleanup technologies. Four of the five recommendations were completed and resolved by March 2012, and the final recommended action (remedy modification) was completed in August 2012.

Since 2009, the Site PRPs have continued to implement ERD as the remedial action for Site groundwater. Review of the reports and analytical data generated from continued injections and monitoring indicates that COC concentrations in groundwater continue to decrease.

Two issues were identified in this Fourth Five-Year Review Report. The issues are the potentially unrecognized presence of 1,4-dioxane, not previously sampled for, in Site groundwater; and a groundwater remedial goal (RG) from the 1991 ROD that is no longer protective. Both issues could affect remedy protectiveness in the future, but neither issue affects current protectiveness of the remedy.

The remedy at the Medley Farm Drum Dump Superfund Site currently protects human health and the environment. Highly contaminated soils were excavated and removed in the 1983 Removal Action, while deeper soils were treated by SVE successfully between 1995 and 2004. Contaminated ground water is currently being treated using ERD. For the remedy to be protective over the long term, the potential presence of 1,4-dioxane in Site groundwater needs to be determined, and the remedial goal (RG) for 1,1-dichloroethane need to be revised and updated.

Since ongoing remedial action has not achieved the cleanup standards set forth in the ROD, a Five-Year Review Report will be necessary to re-evaluate the effectiveness of the remedy, on or before five years from the date of signature of this Five-Year Review Report.

Five-Year Review Summary Form

SITE IDENTIFICATION		
Site name: Medley Farm Drum Dump		
EPA ID: SCD 980 558 142		
Region: 4	**State:** SC	**City/County:** Gaffney Cherokee County
SITE STATUS		
NPL status: X Final ¯ Deleted ☐ Other (specify)		
Remediation status (choose all that apply): _ Under Construction X Operating ☐ Complete		
Multiple OUs? ☐ YES X NO	**Construction completion date:** 09 29 1995	
Has Site been put into reuse? ¯ YES X NO		
REVIEW STATUS		
Lead agency: X EPA ☐ State ☐ Tribe ☐ Other Federal Agency		
Author name: Timothy Kadar		
Author title: Environmental Health Manager II	**Author affiliation:** SCDHEC	
Review period: 09 02 2009 to 09 01 2014		
Date(s) of Site inspection: 04 01 2014		
Type of review: X Post-SARA ¯ Pre-SARA ¯ ☐ NPL-Removal only ☐ Non-NPL Remedial Action Site ☐ ☐ NPL State Tribe-Lead ☐ Regional Discretion		
Review number: ¯ 1 (first) ☐ 2 (second) ☐ 3 (third) X 4 (fourth)		
Triggering action: ☐ Actual RA On-Site Construction at OU # ☐ Actual RA Start at OU# ☐ Construction Completion X Previous Five-Year Review Report ☐ Other (specify)		
Triggering action date: 09 01 2009		
Due date: 09 01 2014		

* ["OU" refers to operable unit.]

Five-Year Review Summary Form (continued)

Issues/Recommendations				
OU(s) without Issues/Recommendations Identified in the Five-Year Review:				
None				
Issues and Recommendations Identified in the Five-Year Review:				
OU(s): OU1	**Issue Category:** Remedy Performance			
	Issue: 1,4-dioxane has not been sampled for in Site groundwater. The potential presence of 1,4-dioxane in groundwater needs to be determined.			
	Recommendation: Add 1,4-dioxane to list of analytes in selected wells to determine presence/absence in groundwater.			
Affect Current Protectiveness	**Affect Future Protectiveness**	**Implementing Party**	**Oversight Party**	**Milestone Date**
No	Yes	PRP	EPA/State	09/01/2015

OU(s): OU1	**Issue Category:** Remedy Performance			
	Issue: Changes have occurred to the applicable risk criteria for 1,1-dichloroethane and the RG is no longer valid.			
	Recommendation: Reevaluate the RG for 1,1-dichloroethane and derive new site-specific risk-based RG. Modify Site remedy as necessary to include the revised RG.			
Affect Current Protectiveness	**Affect Future Protectiveness**	**Implementing Party**	**Oversight Party**	**Milestone Date**
No	Yes	PRP	EPA/State	09/01/2015

Five-Year Review Summary Form (continued)

OU1 and Sitewide Protectiveness Statement	
Protectiveness Determination: Short-term Protective	*Addendum Due Date if applicable):* N/A
Protectiveness Statement: The remedy at the Medley Farm Drum Dump Superfund Site currently protects human health and the environment. For the remedy to be protective over the long term, the potential presence of 1,4-dioxane in Site groundwater needs to be determined, and the remedial goal (RG) for 1,1-dichloroethane needs to be revised and updated.	

Environmental Indicators

- Current human exposures at the Site are under control.
- Current ground water migration is under control.

Are Necessary Institutional Controls in Place?

☒ All ☐ Some ☐ None

Has EPA Designated the Site as Sitewide Ready for Anticipated Use?

☐ Yes ☒ No

Has the Site Been Put into Reuse?

☐ Yes ☒ No

1.0 Introduction

The purpose of a five-year review (FYR) is to evaluate the implementation and performance of a remedy in order to determine if the remedy will continue to be protective of human health and the environment. FYR reports document FYR methods, findings and conclusions. In addition, FYR reports identify issues found during the review, if any, and document recommendations to address them.

The United States Environmental Protection Agency prepares FYRs pursuant to the Comprehensive Environmental Response, Compensation and Liability Act (CERCLA) Section 121 and the National Oil and Hazardous Substances Pollution Contingency Plan more commonly called the National Contingency Plan or NCP. CERCLA Section 121 states:

If the President selects a remedial action that results in any hazardous substances, pollutants, or contaminants remaining at the Site, the President shall review such remedial action no less often than each five years after the initiation of such remedial action to assure that human health and the environment are being protected by the remedial action implemented. In addition, if upon such review it is the judgment of the President that action is appropriate at such Site in accordance with section [104] or [106], the President shall take or require such action. The President shall report to the Congress a list of facilities for which such review is required, the results of all such reviews, and any actions taken as a result of such reviews.

EPA interpreted this requirement further in the NCP. The Code of Federal Regulations (CFR) states, in 40 CFR §300.430(f)(4)(ii):

If a remedial action is selected that results in hazardous substances, pollutants, or contaminants remaining at the Site above levels that allow for unlimited use and unrestricted exposure, the lead agency shall review such action no less often than every five years after the initiation of the selected remedial action.

The South Carolina Department of Health and Environmental Control (SCDHEC) conducted the FYR and prepared this report regarding the remedy implemented at the

Medley Farm Drum Dump Superfund Site in Gaffney, Cherokee County, South Carolina. SCDHEC personnel conducted this review from March 2014 to July 2014. EPA is the lead agency for developing and implementing the remedy for the potentially responsible party (PRP)-lead cleanup at the Site.

This is the fourth Five-Year Review for the Site. The triggering action for this review is the signature date of the third Five-Year Review, on September 1, 2009. The Five-Year Review is required because hazardous substances, pollutants, or contaminants remain at the Site above levels that allow for unlimited use and unrestricted exposure. This FYR Report addresses the entire Site.

2.0 Site Chronology

Table 1 lists the dates of important events for the Site.

Table 1: Chronology of Site Events

Date	Event
1973 to 1976	Disposal of hazardous materials at the Site
May 1983	Site Initially investigated by SCDHEC
June 20, 1983	EPA initiates an immediate removal action
July 21, 1983	EPA removal action completed
June 1986	Cost recovery action initiated against Site owner and waste generators
June 10, 1986	Site Proposed to the NPL
April 29, 1987	Completion of Preliminary Assessment / Site Inspection activities
January 1, 1988	Administrative Order on Consent for RI/FS
March 31, 1989	Final Listing on NPL
March 1991	Remedial Investigation/Feasibility Study (RI/FS) completed
May 29, 1991	Record of Decision (ROD)
March 27, 1992	Consent Decree for RD/RA
September 1993	Final Remedial Design Report
December 10, 1993	Explanation of Significant Differences
June 3, 1994	SVE & groundwater remediation construction begins
March 30, 1995	Final Inspection of soil and groundwater cleanup systems
September 29, 1995	Preliminary Closeout Report
1998	Installation of 8 additional wells for SVE enhancement
July 21, 1999	First Five-Year Review Report
2000-2001	SVE & groundwater remediation system optimized with installation of 3 dual-phase extraction wells
September 2004	EPA approves PRPs' ERD work plan/design report
September 2004	SVE and groundwater treatment terminated
September 30, 2004	Second Five-Year Review Report
October 2004 – August 2006	ERD – first through fourth aquifer injections & Site monitoring
June 2007	Aquifer injection treatments suspended (approved hiatus) until June 2008
September 2007	Site-wide sampling event
July – September 2008	Fifth aquifer injection
May 2009	Restrictive Covenant
September 1, 2009	Third Five-Year Review Report
August – October 2009	Sixth aquifer injection
April 2010	Vapor Intrusion Study
August 17, 2010	2010 Remedial Action Biennial Report

Date	Event
September 2010	2nd Explanation of Significant Differences
August – December 2011	Installation of 4 injection wells
December 2011	Focused Feasibility Study
February – June 2012	Seventh aquifer injection
March 20, 2012	Amended Record of Decision (AROD) Public Meeting
August 15, 2012	Amended Record of Decision
December 6, 2012	Tracer Update Study
June 2013	2012 Remedial Action Biennial Report
September 16, 2013	Revised RD/RAWP Work Plans submitted by PRPs
February 2014	Quality Assurance Project Plan (QAPP) and Health & Safety Plan approved
February 2014	Amended Consent Decree for RD/RA entered by Court
April 2014	Fourth Five-Year Review Site Inspection

3.0 Background

3.1 Physical Characteristics

The 62-acre Site is located 6 miles south of Gaffney, Cherokee County, in a rural area of north-central South Carolina (Figure 1). The Site is a mixture of pasture and woodlands. The Site is located in an area of rolling hills with elevations ranging from 570 to 680 feet above mean sea level. The Site lies within the Kings Mountain Belt of the Piedmont Physiographic Province. Bedrock in the Kings Mountain Belt consists of a sequence of interbedded, metamorphosed and deformed volcanic and sedimentary rocks. These metavolcanic and metasedimentary units strike northeast and dip moderately to steeply to the southeast.

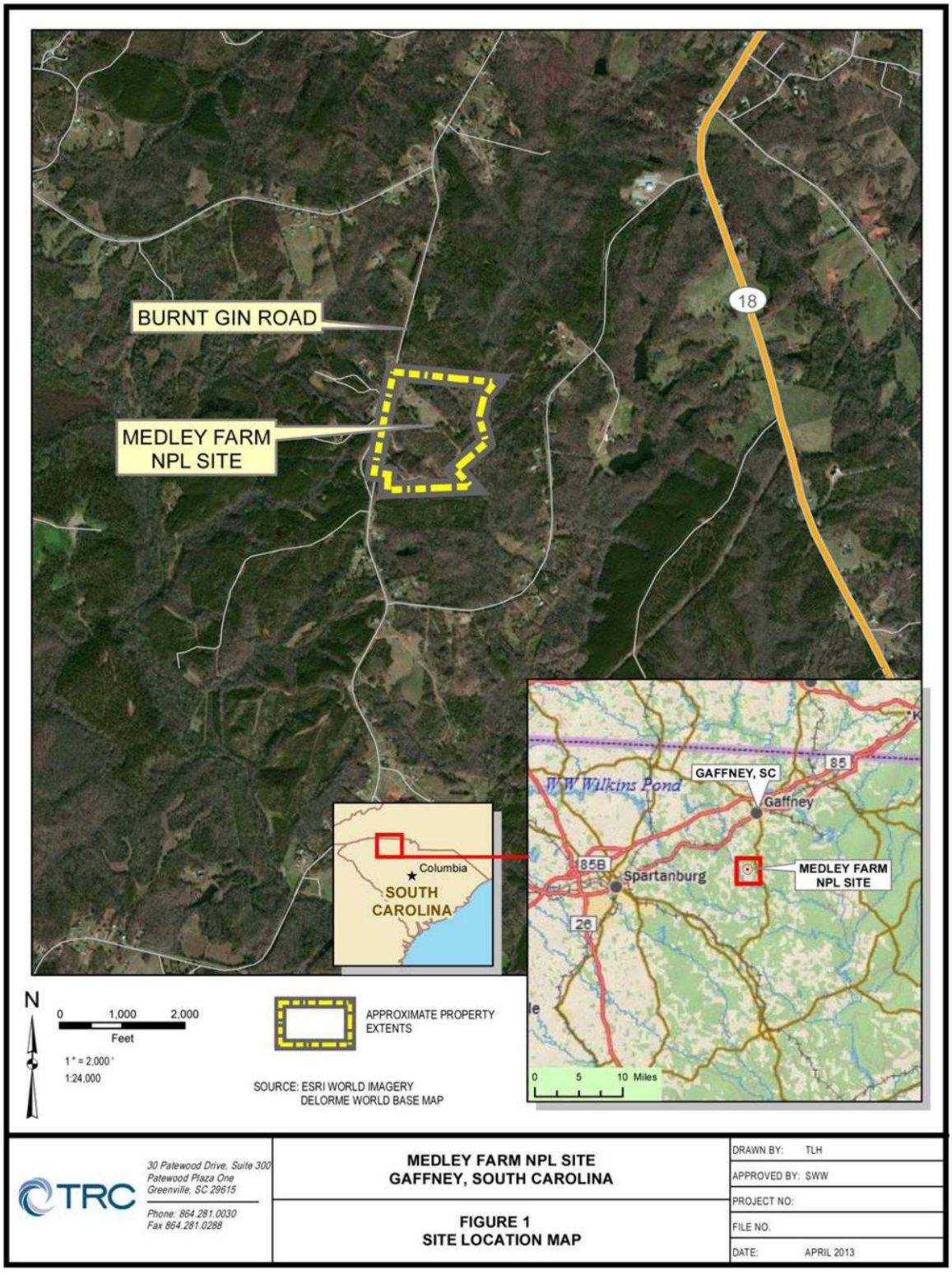
Residual soil at the Site is absent or occurs as a thin layer overlying the saprolite. This soil layer ranges in thickness from zero to 11 feet and typically consists of clayey silt with varying amounts of fine sand, clay, mica flakes, and quartz gravel.

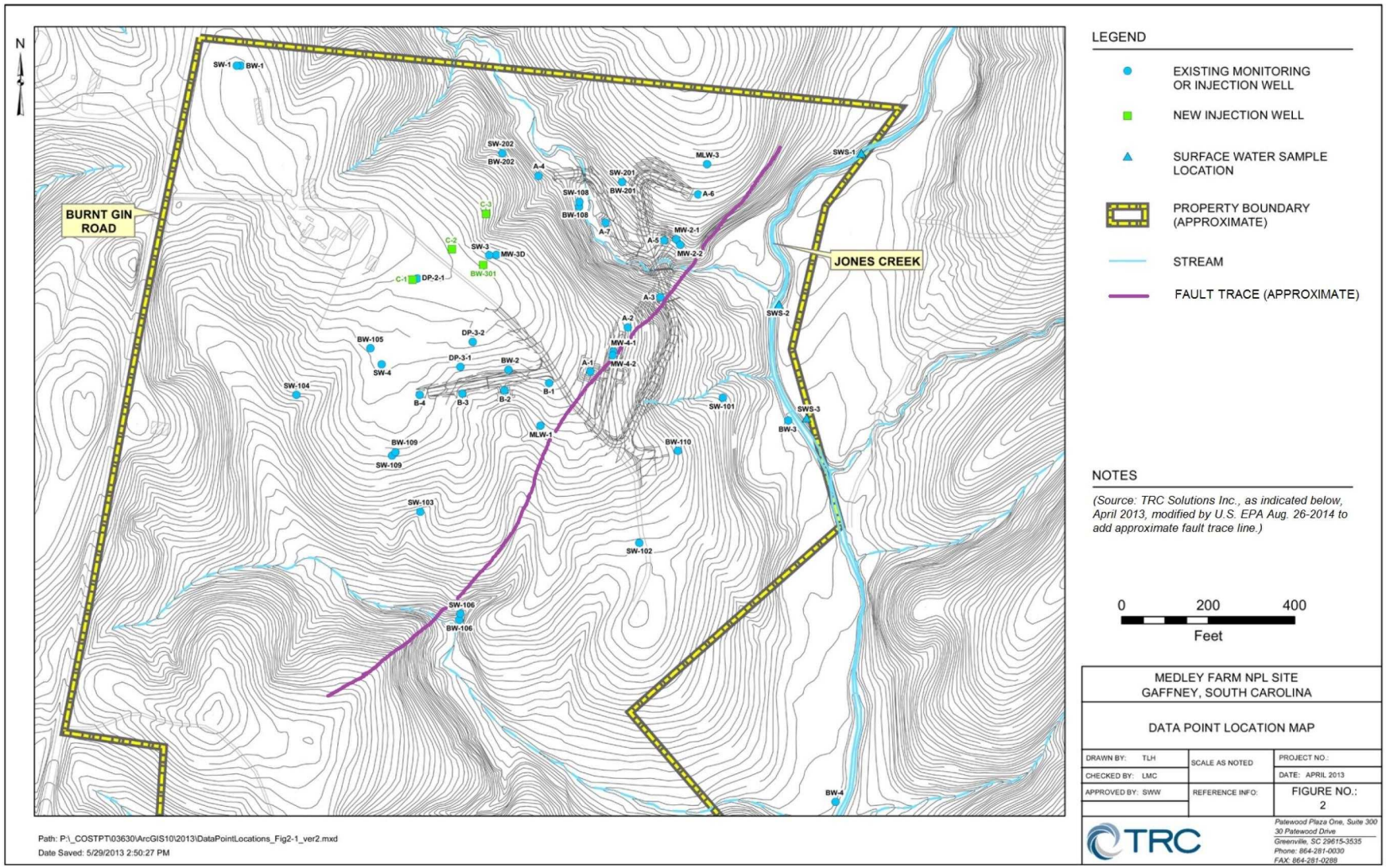
The saprolite is relatively thick across the Site, ranging from 50 to 70 feet thick near the former disposal areas to 7 to 28 feet along Jones Creek at the eastern boundary of the property. The saprolite consists predominantly of silt with varying amounts of fine to coarse sand and clays. The underlying bedrock consists primarily of granitic gneiss.

Groundwater at the Site occurs in the saprolite, in the zone of highly fractured and weathered bedrock zone (identified as the transition zone), and in moderately fractured bedrock underlying the Site. A controlling factor on the direction of volatile organic compound (VOC) migration in the subsurface is the presence of a normal fault located southeast and downgradient of the recovery wells. The existence of the fault was recognized in the early phase of the Site's remedial design (RD) in 1993, and was based on geologic field mapping, geologic study of trenches across the apparent fault line, contours indicated on top-of-bedrock maps created from continuous rock-core drilling at Site boreholes, and observations of in-situ rock outcrops on Jones Creek. The fault strikes N50E and dips 70 degrees to the northwest.

The fault is a major reason for the elongation of the impacted groundwater plume to the northeast of the former disposal areas. The fault, and the related joints and fractures aligned parallel to it, serve to block southeastward flow of groundwater into Jones Creek, instead fostering a northeastward flow direction. Figure 2 shows the location of all Site wells and data points. As shown in Figure 2, the fault lies along a northeast-trending line just southeast of wells MLW-1, A-1, A-2, and A-3.

Depth to groundwater at the Site ranges from 56 to 68 feet in the former disposal area, decreasing to six to eight feet adjacent to Jones Creek. The saprolite, transition zone, and shallow bedrock are hydraulically interconnected; therefore, these three units are considered a single aquifer.


BURNT GIN ROAD
MEDLEY FARM NPL SITE
18
Columbia
SOUTH CAROLINA
GAFFNEY, SC
Gaffney
W.W Wilkins Pond
85
85B
Spartanburg
26
MEDLEY FARM NPL SITE
0 5 10 Miles
N
0 1,000 2,000
Feet
1 " = 2,000 '
1:24,000
APPROXIMATE PROPERTY EXTENTS
SOURCE: ESRI WORLD IMAGERY
DELORME WORLD BASE MAP
TRC
30 Patewood Drive, Suite 300
Patewood Plaza One
Greenville, SC 29615
Phone: 864.281.0030
Fax 864.281.0288
MEDLEY FARM NPL SITE
GAFFNEY, SOUTH CAROLINA
FIGURE 1
SITE LOCATION MAP
DRAWN BY: TLH
APPROVED BY: SWW
PROJECT NO:
FILE NO.
DATE: APRIL 2013


N
BURNT GIN ROAD
JONES CREEK
SW-1
BW-1
SW-202
BW-202
A-4
SW-201
BW-201
MLW-3
SWS-1
A-6
SW-108
BW-108
A-7
C-3
C-2
SW-3
MW-3D
BW-301
C-1
DP-2-1
A-5
MW-2-1
MW-2-2
A-3
A-2
SWS-2
DP-3-2
BW-105
SW-4
DP-3-1
BW-2
MW-4-1
MW-4-2
A-1
SW-104
B-4
B-3
B-2
B-1
SW-101
SWS-3
BW-3
MLW-1
BW-110
BW-109
SW-109
SW-103
SW-102
SW-106
BW-106
BW-4
LEGEND
EXISTING MONITORING OR INJECTION WELL
NEW INJECTION WELL
SURFACE WATER SAMPLE LOCATION
PROPERTY BOUNDARY (APPROXIMATE)
STREAM
FAULT TRACE (APPROXIMATE)
NOTES
(Source: TRC Solutions Inc., as indicated below, April 2013, modified by U.S. EPA Aug. 26-2014 to add approximate fault trace line.)
0
200
400
Feet
MEDLEY FARM NPL SITE
GAFFNEY, SOUTH CAROLINA
DATA POINT LOCATION MAP
DRAWN BY: TLH
CHECKED BY: LMC
APPROVED BY: SWW
SCALE AS NOTED
REFERENCE INFO:
PROJECT NO.:
DATE: APRIL 2013
FIGURE NO.: 2
TRC
Patewood Plaza One, Suite 300
30 Patewood Drive
Greenville, SC 29615-3535
Phone: 864-281-0030
FAX: 864-281-0288
Path: P:_COSTPT\03630\ArcGIS10\2013\DataPointLocations_Fig2-1_ver2.mxd
Date Saved: 5/29/2013 2:50:27 PM

3.2 Land and Resource Use

Land use in the vicinity of the Site is primarily agricultural and residential. Since the completion of a 1983 EPA Removal Action, the former disposal area has been maintained as a grass covered field. The former disposal area and the resultant groundwater contamination plume occupy an area of approximately 10 acres. The 65-acre parcel is vacant with the exception of one residence located 300 feet northwest (topographically upgradient) of the closest affected groundwater monitoring well. Land uses, and the rural character of the surrounding area, have changed very little since the time of the ROD (1991).

Drinking water in the area is supplied by the Spartanburg Joint Water District (SJWD), via water lines that run along Burnt Gin Road, Fortanberry Road to the west, and Roundtree Road to the south and east. However, according to SCDHEC there are a few residences within ½-mile of the Site that continue to rely on private drinking water wells. The water authority obtains its water from nearby rivers.

3.3 History of Contamination

From approximately 1966 to 1976, several area textile, paint, and chemical manufacturing firms paid to dispose of their industrial wastes on the Medley property. The Site was first documented in 1981 when a firm disposing of wastes at the Site complied with the disposal notification requirements of CERCLA, reporting its use of the Site to EPA.

3.4 Initial Response

The first regulatory actions taken at the Site occurred in May 1983 as a response to a local citizen who witnessed the disposal of drums at the Site. SCDHEC investigated the citizen's complaint and took samples at the Site. The EPA was notified and sampled the Site by the end of May.

An emergency removal operation was conducted by the EPA from June to July 1983. The EPA removed 5,383 fifty-five-gallon drums and fifteen-gallon pails of waste, 2,132 cubic yards of refuse and contaminated soil, 24,000 gallons of liquids from the drums, and 70,000 gallons of water and sludge from six small waste lagoons on the Site. The lagoon areas

were then backfilled and graded. Testing of the solid and liquid waste materials removed from the property indicated that the primary chemicals of concern were VOCs. The Site was proposed for addition to the National Priorities List (NPL) in June 1986. The Site was placed on the NPL in March 1989.

SCDHEC and EPA conducted several investigative studies of the Site during 1983 and 1984. Studies included the sampling of private wells in the Site vicinity, a geological study, more extensive groundwater sampling, and a preliminary investigation of Site hydrogeology. During this same period, EPA compliance staff also initiated investigations to identify individuals and firms responsible for the waste disposal activities. Over the following two and a half years, EPA negotiated with several of the potentially responsible parties (PRPs) to investigate contamination at the Site. EPA completed a Preliminary Assessment and a Site Inspection in 1984 and 1987, both of which recommended further assessment and response at the Site. The EPA also completed enforcement activities necessary to propose the Site to the National Priorities List (NPL) between 1984 and 1987.

In January 1988, five PRPs signed an Administrative Order of Consent with EPA, under which they agreed to conduct a Remedial Investigation Feasibility Study (RI FS) for the Site. Sirrine Environmental Consultants, hired by the PRPs, completed RI FS in early 1991. The RI FS determined that Site soil was contaminated with VOCs in three primary areas, and groundwater was contaminated with VOCs.

3.5 Basis for Taking Action

The Site RI FS was completed in early 1991. Investigation results indicated that that hazardous substances were present in soil and groundwater at the Site. Contaminants of concern (COCs) for which remediation goals (RGs) were established are listed below.

Groundwater (14):

Acetone	1,1-Dichloroethene
Benzene	1,2-Dichloroethene
2-Butanone	Methylene Chloride
Chloromethane	Tetrachloroethylene
Chloroform	Trichloroethylene
1,1-Dichloroethane	1,1,1-Trichloroethane
1,2-Dichloroethane	1,1,2-Trichloroethane

Soil (11):

Acetone	1,1,2-Trichloroethane
1,1-Dichloroethane	Trichloroethylene
1,2-Dichloroethane	Tetrachloroethylene
1,1-Dichloroethene	Chloroform
1,2-Dichloroethene (total)	Methylene Chloride
1,1,1-Trichloroethane	

A Baseline Risk Assessment (BRA) was performed as part of the RI FS. Results indicated that Site contaminant concentrations in groundwater presented unacceptable risk to human health and the environment. While all potential pathways of exposure were considered, the one which presented unacceptable risk was an assumed future-use scenario in which groundwater was used as a drinking water source. Unacceptable risk was found not to exist for the current-use scenario. Site soils were found to pose no unacceptable risks under either current-use or future-use scenarios.

4.0 Remedial Actions

4.1 Remedy Selection

EPA selected the Site remedy in the May 1991 ROD. The Site remedy included the following Remedial Action Objectives (RAOs), which were clarified and re-stated in the 2012 AROD:

- Restore COC-contaminated groundwater throughout the plume to concentrations that allow beneficial use (drinking water).
- Reduce or eliminate the potential for contaminated groundwater to impact beneficial uses of groundwater in areas near the Site.
- Prevent migration of chemical residues from unsaturated soils into the groundwater system.
- Manage and monitor the migration of on-site groundwater to prevent the discharge of site-related COCs to surface water.

The ROD established cleanup goals (remedial goals, RGs) for 11 the soil COCs and 14 groundwater COCs listed above in section 3.5, as shown below (Table 2).

Table 2: 1991 Site COCs and Cleanup Goals

ROD-Established Cleanup Goals for Soils & Groundwater		
COC	Soil Cleanup Goal (µg/kg)[2]	Groundwater Cleanup Goal[1] (µg/L)[3]
Acetone	12,000	350[4]
Benzene	NA	5
2-Butanone	NA	2,000[4]
Chloromethane	NA	63[4]
Chloroform	3,000	100[5]
1,1-Dichloroethane (1,1-DCA)	100	350[4]
1,2-DCA	60	5
1,1-Dichloroethene (1,1-DCE)	270	7
cis-1,2-DCE	2,100 (total)	70
trans-1,2-DCE	2,100 (total)	100
Methylene Chloride	40	5[6]
Tetrachloroethene (PCE)	1,600	5
1,1,1-Trichloroethane (1,1,1-TCA)	26,000	200[6]
1,1,2-TCA	160	5
Trichloroethene (TCE)	500	5
Vinyl Chloride	NA	2

1 – Source for Groundwater Cleanup Goals is the applicable Maximum Contaminant Level (MCL) unless noted otherwise.
2 – Micrograms per kilogram.
3 – Micrograms per liter.
4 – Cleanup goal derived in the Site Baseline Risk Assessment (1990).
5 – This RG was changed to 70 µg/L by the 2012 AROD. See discussion below.
6 - This MCL was a "Proposed MCL" at the time of the ROD and was later finalized.

The May 1991 ROD selected a Site remedy which included components for soil (source control) and groundwater:

Soil

Construction and operation of a Soil Vapor Extraction (SVE) system:

- Installation of a network of air extraction wells in the unsaturated zone

- Construction of a pump and manifold system that applies a vacuum on the air extraction wells to remove the contaminants from the soil
- Use of an in-line vapor-phase carbon absorption system to trap and absorb the soil vapor, prior to its release to the atmosphere

Groundwater

Construction and operation of a groundwater pump-and-treat system:

- Extraction of contaminated groundwater
- On-Site treatment of extracted groundwater via air stripping, with the need for controlling air stripper emissions to be evaluated in the remedial design
- Off-Site discharge of treated groundwater to Jones Creek via a National Pollution Discharge Elimination System (NPDES) permit
- Continued analytical monitoring of groundwater and surface water

The remedy was modified in December 1993 by an Explanation of Significant Difference (ESD) issued by EPA Region 4. The ESD removed the requirement to treat groundwater and SVE system air emissions prior to discharge. This decision was based on air dispersion modeling. Modeling also indicated that anticipated emission levels for both systems were well below those, which could require treatment under a permit. Results from monitoring of both systems during startup operations in 1995 validated the modeling and the decision to issue the ESD.

A second ESD was completed in September 2010. The ESD added the requirement that institutional controls (ICs) be implemented on the property as part of the groundwater remedy. The required ICs were implemented by the PRPs in May 2009 in the form of a Restrictive Covenant. The covenant restricts designated land uses by prohibiting any residential use and educational use for children young adults in kindergarten through twelfth grade; prohibiting the use of groundwater for any purpose until drinking water standards are met; and prohibiting any activity at the Site that may impede implementation of the remedy. The Restrictive Covenant is recorded at the Cherokee County Courthouse in Gaffney, SC. The second ESD proposed ICs at the Site because ICs were not included in the original Site remedy.

An Amended ROD (AROD) was signed in August 2012. The AROD did not make any changes to the RAOs, COCs, or the soil remedy. The purpose of the AROD was to change the selected remedy for groundwater.

In summary, the components for the Selected Remedy are:

- Design and construct the expansion of the injection system infrastructure
- Implement five Enhanced Reductive Dechlorination (ERD) injection treatments over five years; conduct the associated groundwater monitoring to ensure ERD effectiveness and verify natural attenuation parameters, for an additional five years or until Site groundwater cleanup goals are met;
- Continue periodic monitoring of Site groundwater and surface water to verify achievement of groundwater cleanup levels;
- Maintain and enforce existing institutional controls (land and groundwater use restrictions);
- Support EPA's conduct of Five-Year Reviews, to ensure protectiveness of the remedy; and,
- Continue Site maintenance activities.

Monitored Natural Attenuation (MNA) was selected as a Contingency Remedy. In summary, the components for the Contingency Remedy are:

- Implement a detailed and systematic program of periodic groundwater and surface water monitoring, following EPA's Monitored Natural Attenuation (MNA) Guidance, for an anticipated period of 30 years or until the Site cleanup goals are met;
- Maintain, monitor and enforce existing institutional controls (land and groundwater use restrictions);
- Support EPA's conduct of Five-Year Reviews, to ensure protectiveness of the remedy; and,
- Continue Site maintenance activities.

The 2012 AROD modified one Site groundwater RG, for chloroform. Chloroform is a trihalomethane. Since the time of the 1991 ROD, an MCL of 70 µg L was finalized and assigned to chloroform alone, within the trihalomethane group. The AROD modified the RG to be the newer MCL.

4.2 Remedy Implementation

During the latter half of 1991 EPA and a group of PRPs negotiated a Consent Decree (CD) for design and implementation of the Site's Remedial Design Remedial Action Work Plan. The CD was entered by the Court on March 27, 1992. The CD was assigned Civil Action Number 6:92-0153-20.

In 1992 the PRPs selected RMT, Inc. (later known as TRC) of Greenville SC as their RD RA Contractor. EPA approved the remedial design for cleanup of the Site in September 1993. The PRPs' contractor operated the groundwater pump-and-treat system, and for soil the SVE system, from January of 1995 through late 2004. Although the two systems are no longer in operation, in order to better explain the overall remedy that has been implemented, they are briefly described here.

The groundwater pump-and-treat system design included 11 extraction (pumping) wells and associated pipelines to direct the extracted groundwater to a central air-stripping unit. The system operated as a pressurized "jet pump" closed loop, with water drawn into the pumping wells via suction-based venturi intakes; no electric pumps or "moving parts" were mounted inside the wells. A low-profile air-stripping unit removed the VOCs from groundwater. After treatment, the water was discharged to Jones Creek under NPDES Permit No. S00046469. The permit has been maintained since 2004. The SVE system design included an array of 9 vapor extraction wells piped to a central vacuum apparatus, to remove VOCs from three main areas of soil contamination (designated "Area 1," "Area 2" and "Area 3"). An additional eight vapor monitoring wells were installed around the three areas to monitor system effectiveness.

Onsite construction of the SVE and groundwater remediation systems began in June 1994. The majority of the construction work was completed by early December 1994. By February 1995, final inspections on both systems had been completed, and both systems were started. During 1995 the PRPs' contractor guided both systems through successful "shakedown" operational periods which were documented in the September 1995 Preliminary Closeout Report.

In 1998, as an optimization measure and to enhance the recovery of soil vapors from the subsurface, the SVE system was augmented by the connection of all of the eight soil vapor monitoring wells to the vacuum extraction system. In October 2000, one additional SVE well and three dual phase (DP) wells (combination vapor- and groundwater-recovery wells), were installed to further enhance removal of VOCs from the subsurface.

The groundwater treatment and SVE systems operated continuously between 1995 and 2004. As documented in the first (1999) Five-Year Review, concentrations of all of the Site groundwater contaminants decreased substantially during the groundwater extraction system's first four years of operation after 1995. In 1999, in response to decreasing recovery from the SVE system, the PRPs' contractor collected soil and groundwater samples from seven soil borings completed in the three soil treatment areas. Results from these PSVP borings demonstrated that the soil cleanup goals had been achieved in two of the three defined soil treatment areas (Area 1, Area 2). Consequently SVE operations were terminated in Areas 1 and 2 in June 2000. However, groundwater sampling in the remaining area subject to SVE treatment, Area 3, found contamination at levels that exceeded those in any of the groundwater recovery wells.

To address the contamination, three DP recovery wells were installed in October 2000 in Area 3, to enhance the capture of both soil vapor and groundwater for treatment. The installation of these wells was part of a technical maximization program. Other groundwater measures implemented included alternate pumping, and pulse purging, of the pump-and-treat system. In 2001, a 120-foot bedrock monitoring well (designated MW-3D) was installed to better characterize the VOC concentration remaining in groundwater in this area (Area 3).

Continued SVE and groundwater systems operations over the next four years generated an increased yield of VOC contaminant mass removed from the aquifer and Site soils. As of September 2004, the groundwater recovery and treatment system had captured and treated more than 100 million gallons of groundwater and removed approximately 243 pounds of

VOCs, and more than 2,250 pounds of VOCs had been removed by the SVE system. At that time, however, based on declining performance from both the groundwater treatment and SVE systems, EPA and SCDHEC approved cessation of groundwater pump-and-treat operations. For the soil component (SVE), confirmatory sampling had shown that cleanup goals were met. Concurrently, EPA and SCDHEC approved the PRPs' work plans for a Supplemental Remedial Action (RA) for groundwater, which utilizes an enhanced reductive dechlorination (ERD, a type of insitu biodegradation) treatment process.

The Supplemental RA was a technical maximization (optimization) measure intended to accelerate remedy completion, by more effectively treating the remaining areas of groundwater which still contained contaminants above the groundwater standards. Technical maximization measures (TMM) are generally described in Section 11 (The Selected Remedy) of the 1991 ROD.

In September 2004, the PRPs initiated ERD at the Site as an approved TMM. The former groundwater recovery wells (11 in total) and various other strategically-located monitoring wells were retrofitted to receive injection of a lactate-based nutrient suspension, designed to stimulate the growth of the anaerobic microorganisms responsible for ERD of VOCs. Subsequently, ERD nutrient injections were conducted at 13 Class V A-I injection wells under the terms of Underground Injection Control (UIC) Permit #763. The permit was issued by SCDHEC in September 22, 2004 and subsequently revised on November 29, 2011.

Since October 2004, a total of seven ERD nutrient injection events have been conducted at the Site. Each nutrient injection event has been followed by a 6-month period, in which subsurface microbes were allowed to grow and metabolize Site COCs. After 6 months, the groundwater quality was sampled and analyzed to evaluate ERD performance. Groundwater sampling results collected and evaluated after each of these ERD injection events have confirmed that anaerobic organisms are reproducing and thriving in the modified groundwater quality environment.

Ongoing Site performance monitoring has shown that the success of the ERD treatment is largely dependent upon whether and to what degree, the injected nutrient suspension can be distributed within and across the VOC-impacted groundwater plume. Installation of four additional nutrient injection wells within the northern plume was completed in late 2011 to better promote and maintain effective dispersion of the ERD nutrients and facilitate anaerobic VOC treatment.

4.3 Operation and Maintenance

The SVE and groundwater pump-and-treat systems are no longer operating at the Site. Both systems have been maintained and could be placed into service if needed. Monitoring and pumping wells are inspected and maintained for use in the onsite activities. The NPDES permit governing discharge to Jones Creek has been maintained for use if necessary, and the reporting required for it continues.

Excluding the report-writing and project management necessary to conduct the RA, the operations that comprise the RA consist of conducting the groundwater injection events and the groundwater sampling which follow them. As mentioned above, injection of the treatment solutions requires preparing mixtures of the nutrient components with water, which is obtained from clean wells onsite. The UIC permit (State of SC UIC Permit No. 763) has also been maintained as necessary to govern the injection activities.

The cost figures provided below are approximations and should not be regarded as detailed cost accounting. The Steering Committee provided all figures and estimates to the EPA. Between 2009 and 2013, the Site PRPs have spent approximately $1.5 million for Operations and Maintenance (O&M) and remedy enhancements. Based on consultant, utility, and administrative invoices, along with EPA oversight payments, the following rough breakdown of the $1.5 million is provided:

- Actual field activities (e.g., injection, monitoring work) 42%
- Data analysis, report preparation, and other non-legal administrative work 37%
- Site maintenance (including utilities costs) 8%

- EPA oversight costs 13%
- TOTAL 100%

5.0 Progress Since the Last Five-Year Review

In September 2009, the third Five-Year Review's protectiveness statement read as follows:

"The remedy at the Medley Farm currently protects human healthy and the environment because the soil cleanup goals were attained in 2004, the groundwater remediation is continuing to decrease the concentrations of COCs, and no one is drinking water from the contaminated groundwater plume. However, in order for the remedy to be protective in the long term, the following actions need to be taken: modify the decision document to incorporate the requirement for Institutional Controls, modify the decision document to modify the remedial action for groundwater, conduct a vapor intrusion assessment, and revise and update the Quality Assurance Project Plan (QAPP)."

The 2009 Five-Year Review identified five issues with corresponding recommendations.

This report summarizes each recommendation and its status below.

Table 3: Progress on Recommendations from 2009 FYR

Issue	Party Responsible	Milestone Date	Action Taken and Outcome	Date of Action
A revised and updated QAPP is needed to document the quality assurance activities that are being performed for the RA.	PRP	02/28/2010	QAPP was completed	September 2011
The ROD needs to be modified through either an ESD or ROD Amendment to require Institutional Controls.	EPA	05/31/2010	ESD completed	September 2010
The ROD needs to be modified through either an ESD or ROD Amendment to select an appropriate remedial technology for Site RA.	EPA	05/31/2010	AROD completed	August 2012
Vapor Intrusion pathway should be evaluated for the Site.	EPA/State	05/31/2010	Vapor Intrusion Study completed	April 2010
Update Site Repository information or location.	EPA	05/31/2010	Site Repository re-established and updated.	February 2010, March 2012*

*Completed again in March 2012 as an AROD remedy-selection required activity.

6.0 Five-Year Review Process

6.1 Administrative Components

EPA Region 4 initiated the FYR in March 2014 and scheduled its completion for August 11, 2014. The SCDHEC review team, led by Timothy Kadar, also included the Remedial Project Manager Greg Cassidy, Environmental Health Manager Robert Cole, and the Community Involvement Coordinator (CIC) Donna Moye. The review schedule established consisted of the following activities:

- Community Notification
- Site Inspection (EPA and SCDHEC)
- Community Interviews
- Document Review
- Data Review
- FYR Report Development and Review

6.2 Community Involvement

On April 21, 2014, SCDHEC placed a public notice in the *Gaffney Ledger* announcing the commencement of the FYR process for the Site. Additionally, the public notice and the EPA Fact Sheet "Superfund Today" were mailed to 60 nearby residents. The notice requested community participation in the FYR process and provided contact information for Remedial Project Manager (RPM) Ralph Howard and SCDHEC Community Liaison Donna Moye. The press notice is available in Appendix B. No one contacted the EPA, SCDHEC, or the Site property owner after receiving the advertisement or the post card mailing.

The Five-Year Review report will be made available to the public once it has been issued. Copies of this document will be placed in the designated public repository: Cherokee County Public Library, 300 East Rutledge Avenue, Gaffney, SC 29340 (phone (864) 487-2711).

On April 1, 2014, EPA CIC Sheryl Lane and SCDHEC CIC Donna Moye surveyed the area surrounding the Site within an approximately 0.5 to 1 radius. The following roads were indentified during the survey:

- Burnt Gin Road
- Dusty Trail
- Silica Springs Road
- Sandy Lane
- Fortanberry Road
- Alison Hill Road
- Round Tree Road

Residents along the above named roads within approximately one mile of the Site received a post card notification concerning the Site's FYR. No residents were contacted during the time of the survey for interviews. Interviews with county and city officials were attempted during March, April, and June of 2014. No responses were received. Interview forms are presented in Appendix C.

6.3 Document Review

This FYR included a review of relevant, Site-related documents including the ROD, AROD, ESD, the previous three Five Year Reviews (1999, 2004, and 2009), biennial remedial action progress reports, EPA review comment letters, and recent monitoring data. Appendix D includes a complete list of the documents reviewed.

ARARs Review

CERCLA Section 121(d)(1) requires that Superfund remedial actions attain "a degree of cleanup of hazardous substance, pollutants, and contaminants released into the environment and of control of further release at a minimum which assures protection of human health and the environment." The remedial action must achieve a level of cleanup that at least attains those requirements that are legally applicable or relevant and appropriate.

- Applicable requirements are those cleanup standards, standards of control and other substantive requirements, criteria or limitations promulgated under federal environmental or state environmental or facility siting laws that specifically address

a hazardous substance, remedial action, location or other circumstance found at a CERCLA Site.

- Relevant and appropriate requirements are those standards that, while not "applicable," address problems or situations sufficiently similar to those encountered at the CERCLA Site that their use is well suited to the particular Site. Only those state standards more stringent than federal requirements may be applicable or relevant and appropriate.

- To-Be-Considered criteria are non-promulgated advisories and guidance that are not legally binding, but should be considered in determining the necessary remedial action. For example, To-Be-Considered criteria may be particularly useful in determining health-based levels where no ARARs exist or in developing the appropriate method for conducting a remedial action.

Chemical-specific ARARs are health or risk-based numerical values or methodologies which, when applied to Site-specific conditions, result in the establishment of numerical values. These values establish an acceptable amount or concentration of a chemical that may remain in, or discharged to, the ambient environment. Examples of chemical-specific ARARs include maximum contaminant levels (MCLs) under the federal Safe Drinking Water Act and ambient water quality criteria enumerated under the federal Clean Water Act.

Action-specific ARARs are technology or activity-based requirements or limits on actions taken with respect to a particular hazardous substance. These requirements are triggered by a particular remedial activity, such as discharge of contaminated ground water or in-situ remediation.

Location-specific ARARs are restrictions on hazardous substances or the conduct of the response activities solely based on their location in a special geographic area. Examples include restrictions on activities in wetlands, sensitive habitats and historic places.

Remedial actions are required to comply with the chemical-specific ARARs identified in the ROD. In performing the FYR for compliance with ARARs, only those ARARs that address the protectiveness of the remedy are reviewed.

Ground Water ARARs

According to the Site's 1991 ROD, the groundwater ARARs are the maximum contaminant levels (MCLs), Safe Drinking Water Act (40 Code of Federal Regulations (Parts 141-143) and SCDHEC R.61-58.5(P)(2) for total trihalomethanes, including chloroform. For COCs without a MCL, a cleanup goal was derived in the Baseline Risk Assessment.

Table 4: Summary of Groundwater ARAR Changes

Summary of Groundwater ARAR Changes			
COC	**Current ARARs (µg/L)**	**1991 ROD ARARs* (µg/L)**	**ARAR Change**
Acetone	NA	NA	No
Benzene	5	5	No
Chloroform	70	100	Yes**
Chloromethane	NA	NA	No
1,2-Dichloroethane	5	5	No
1,1-Dichloroethane	NA	NA	No
1,2-cis-Dichloroethylene	70	70	No
1,2-trans-Dichloroethylene	100	100	No
Methyl Ethyl Ketone (2-Butanone)	NA	NA	No
Methylene Chloride	5	5	No
Tetrachloroethylene	5	5	No
1,1,2-Trichloroethane	5	5	No
1,1,1-Trichloroethane	200	200	No
Trichloroethylene	5	5	No

NA: No ARAR exists for these contaminants of concern. Remedial Goals were established based upon the Baseline Risk Assessment.
* MCLs were established as the Remedial Goals in the 1991 ROD.
** The 2012 Amended ROD established the new ARAR as the Remedial Goal.

Institutional Control Review

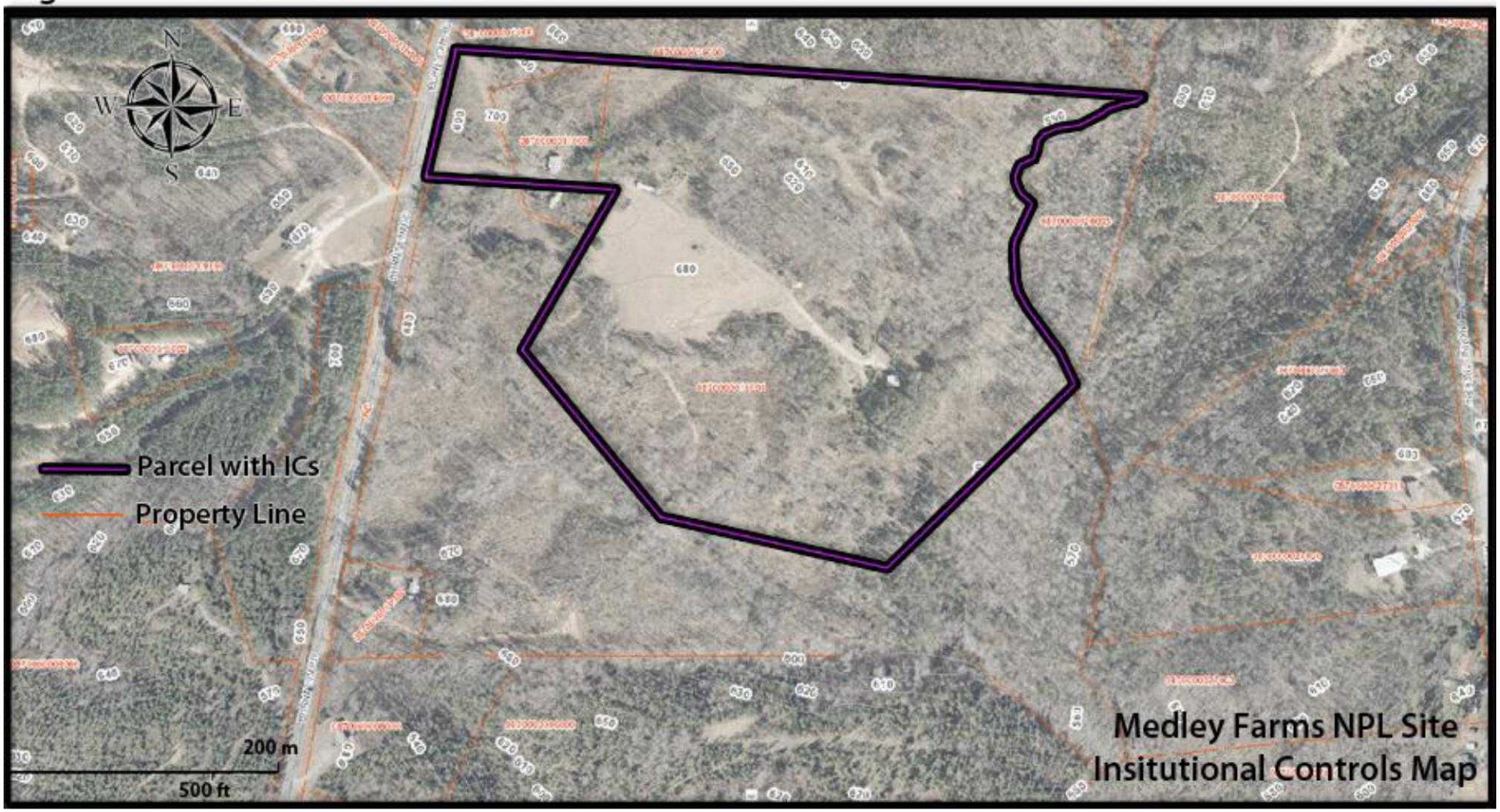
The 1991 ROD did not require institutional controls. The implementation of institutional controls in the form of a restrictive covenant as part of the groundwater remedy was finalized in the September 2010 ESD. A Declaration of Covenants and Restrictions was recorded in the State of South Carolina, County of Cherokee, Deed Book 27, Page 1378 on May 20, 2009 by Samuel C. Medley.

In 2010, EPA evaluated the potential for vapor intrusion at the site to address a recommendation made by the 2009 FYR. The review determined that vapor intrusion at the Medley residence (approximately 300 feet from the nearest affected well and 150-200 feet upgradient of the groundwater plume) is very unlikely. The EPA's draft November 2002 Vapor Intrusion guidance defines "near," in reference to a building's (proposed or existing) proximity to a VOC groundwater plume, as within 100 feet laterally or vertically. There are no other habitable structures on the Site property, and the current restrictive covenant precludes residential use. Commercial development on the property is very unlikely with residential use precluded. Additionally, following the attainment of the RGs, Site groundwater will not contain concentrations of COCs sufficient to cause vapor intrusion. Thus vapor intrusion is not an issue at the Site.

Table 5: Institutional Control Summary Table

Area of Interest – OU1 Groundwater at Medley Farm Drum Dump Site. (Parcels: 0870000011001)						
Media	**ICs Needed**	**ICs Called for in the Decision Documents**	**Impacted Parcel(s)**	**Objective**	**Instrument in Place**	**Notes**
Ground Water	Yes	Yes	0870000011001	Restrict access to contaminated groundwater	Restrictive Covenant as part of groundwater remedy	Restricted against residential use, groundwater use, & interference with remedial activities

Figure 3


N
W
E
S
Parcel with ICs
Property Line
200 m
500 ft
Medley Farms NPL Site -
Insitutional Controls Map

6.4 Data Review

Lactate nutrient performance in groundwater is monitored through the injection of a sodium bromide tracer. Groundwater is sampled on a quarterly basis following the injection of sodium bromide. Water quality sampling and performance monitoring of VOCs and vinyl chloride are performed annually. However, the report summarizing the injection events, water quality, performance monitoring, analytical results, and evaluation is submitted to the EPA and SCDHEC biennially (every other year).

This section of the report includes an evaluation of current groundwater, surface water, and soil conditions and considers potential options for enhancement of the remedial actions. The data are systematically evaluated as follows:

- Groundwater data
- Surface Water data
- Soils

Groundwater Data

In 2004, ERD was initially implemented at the Site as a technical maximization measure to accelerate attainment of the groundwater RGs. ERD works by fostering the growth of anaerobic microbes capable of treating, in situ, the residual levels of VOCs observed at the Site. Since October 2004, seven ERD lactate-based nutrient injection events have been conducted at the Site. Each treatment event has been followed by the collection and analysis of groundwater samples to evaluate ERD performance. The results of groundwater quality monitoring continue to demonstrate the effectiveness of ERD in facilitating the achievement of RGs. The 2009 Third Five-Year Review included an extensive quantitative review of groundwater cleanup progress since 2004. The review concluded that significant reductions in groundwater COC concentrations and remaining contaminant mass have been achieved, and that the strategy employed in the Supplemental RA has in general been successful. Groundwater data from the 2010 and 2012 Biennial RA Progress Reports show continued reductions.

A groundwater tracer study was initiated in 2012 and was conducted concurrently with the seventh ERD injection event. Sodium bromide was selected as the groundwater tracer. Sodium bromide was mixed with the lactate-based solution and injected into five of the 12 wells utilized for ERD treatment. Quarterly bromide monitoring data has provided additional information regarding the flow of groundwater and the migration of VOCs within the aquifer beneath the Site.

Twenty-eight monitoring wells in the Site groundwater monitoring program have been sampled between 2004 and 2014. Groundwater data indicate that, in several limited areas, seven chlorinated VOCs remain in groundwater at concentrations exceeding their respective remediation goals. These VOCs are tetrachloroethene (PCE), trichloroethene (TCE), cis-1,2-dichloroethene (cis-DCE), 1,1,2-trichloroethane (1,1,2-TCA), 1,1-dichloroethene (1,1-DCE), 1,2-dichloroethane (1,2-DCA) and vinyl chloride (VC). Of these, PCE and TCE remain the most common of the reductive-dechlorination parent compounds, and VC is the most common of the daughter compounds. The presence and distribution of daughter compounds indicates ERD is occurring within the active ERD treatment zone. The distribution of VC remains constrained within the active ERD treatment zone and no migration of VC beyond the treatment zone has been observed.

Based on groundwater monitoring data collected through 2014, the footprints of the areas underlain by VOCs remain relatively unchanged since 2009. Four new injection wells were installed in 2011 to allow better distribution of the nutrient amendments within the northern VOC plume area. Nutrient injections into these new wells have resulted in significant reductions in the extent of the PCE and TCE plumes. For PCE, detections since 2004 decreased from 24 to 15 wells and RG exceedences decreased from 16 to four wells. For TCE, detections decreased from 24 to 21 wells and RG exceedences decreased from 20 to 11 wells.

The data indicate that there are treatment inefficiencies in specific areas and or that some VOC rebound is occurring. Upgradient and untreated contaminated groundwater moving towards areas of ERD treatment is one possible source of this rebound. Overall, the data

indicates that ERD continues to be an effective method for progressing towards achieving the Site RGs. As called for in the 2012 AROD, successful active ERD treatment should allow transitioning the Site remedy towards MNA. Appendix E presents groundwater data and plume maps generated since 2009.

Surface water Data

Beginning in June 2008, collection and analysis of surface water samples were added to the ERD performance monitoring program. As reported in the 2010 and 2012 Biennial RA Progress Reports, VOCs are not being detected in the surface water samples collected from Jones Creek.

Soil

Soil remediation goals at the Site were achieved in 2004. No new soil data were collected during the past ten years.

6.5 Site Inspection

The Site Inspection was conducted on April 1, 2014. A tour of the Site was led by Ralph Howard of the EPA. The inspection team consisted of the following personnel: Ralph Howard (EPA), Charles Williams (SCDHEC), Greg Cassidy (SCDHEC), Robert Cole (SCDHEC), and Timothy Kadar (SCDHEC). Steve Webb of TRC Environmental (the PRPs' Contractor) participated also. EPA CIC Sherryl Lane and SCDHEC Community Liaison Donna Moye arrived onsite and then departed to complete the necessary community involvement activities (section 6.2 above).

A visual inspection of the mothballed SVE system, injection, extraction, and monitoring wells, former dump and lagoons area, the water treatment building, and the discharge point on Jones Creek was conducted during the Site inspection. The groundwater system equipment and associated wells used in the injection treatments appeared to be in good condition.

During reconnaissance along the southeastern portion of the Site close to Jones Creek, outside of but close to the Restricted Covenant area, Site inspection participants observed

the effects of land clearing from heavy equipment. Evidence of poor housekeeping was observed in the form of a discarded 5-gallon bucket labeled "hydraulic oil" with stained soil evident near the bucket. Such activities could potentially impact the protectiveness of the remedy through damage to monitoring wells, impeding access to monitoring wells, releasing contaminants to the Site, or through loss of vegetative cover and erosion of soil into Jones Creek. This location is the responsibility of the property owner, who has legal obligations under the Restricted Covenant agreement with the PRPs. The evidence observed did not indicate a threat to the remedy from parties external to the Site.

Based on the observations described above, EPA will discuss this issue with the Site property owner, to remind him of these obligations and secure his cooperation. However, the issue will not be carried forward as Five-Year Review issue or assigned a recommendation.

The Five-Year Review Inspection Checklist, and photographs of the information referenced above, are included in Appendices D and F, respectively.

6.6 Interviews

The FYR process included interviews with parties affected by the Site, including the current Site landowner and regulatory agencies involved in Site activities or aware of the Site. The purpose was to document the perceived status of the Site and any perceived problems or successes with the phases of the remedy implemented to date. All of the interviews were conducted in person or completed by email after the Site inspection. The interviews are summarized below. Appendix C provides the complete interviews.

Ralph Howard: Ralph Howard is the EPA Remedial Project Manager for the Site. Mr. Howard completed his interview on June 13, 2014, via email. Overall, the EPA has a positive impression of the Site, stating that the remedy "..has worked fairly well but not yet treated the affected groundwater down to the cleanup goals" and "only a handful of wells are above standards." Mr. Howard explained that there is a concern that 1,4-dioxane, a stabilizer for TCA, could be an unrecognized COC at the Site. The EPA is not aware of any complaints or inquiries regarding the Site, and believes the Site has had little to no impact on the surrounding community.

Greg Cassidy: Greg Cassidy is the SCDHEC representative for the Site. Mr. Cassidy was interviewed on several occasions between March 22 to July 1, 2014. SCDHEC believes that the remedy written in the AROD is working as designed. Based on monitoring data, the ERD injections can be further refined optimized based on location of injection points, timing of injections, and amount of lactate solution. SCDHEC has no issues with the remedy transitioning to MNA if monitoring data supports the criteria for it.

Samuel Medley: Samuel Medley is the former property owner and currently maintains a residence at the entrance of the Site. Mr. Medley expressed concern that some of his mother's and his health issues could have been caused by prior Site activities. Other than his health concerns, he has no issues or concerns with Site's current remedial activities.

John Goode: John Goode is the current property owner of the Site. Mr. Goode is aware of the environmental issues and remedial activities taking place on his property. He is satisfied with the current state and progress of the Site. He feels the EPA and SDHEC have kept him informed of Site activities and conditions. Mr. Goode is looking to sell the property within the next three months (August 2014 to October 2014).

7.0 Remedy Evaluation

7.1 Question A: Is the remedy functioning as intended by the decision documents?

The review of the groundwater and surface water data, documents, ARARs, risk assumptions, and the Site inspection indicate the groundwater recovery remedy is functioning as intended by the AROD. The ERD strategy implemented through the AROD is reasonable and continues to reduce groundwater contaminant concentrations and remaining contaminant mass.

7.2 Question B: Are the exposure assumptions, toxicity data, clean up levels and RAOs used at the time of remedy selection still valid?

Since the time of the 1990 Site BRA, there have been changes to the risk assessment methodology used to evaluate soil and groundwater exposures, in that inhalation was not considered under either pathway. However, incorporation of the inhalation pathway would not affect the overall risk conclusions of the 1990 BRA. There have also been some changes to the default exposure factors, but these are generally expected to decrease the time-weighted exposures, and thus lessen the calculated risks, for most chemicals. There have been no other changes to groundwater exposure assumptions or RAOs at the Site.

Remedial goals were evaluated to ensure that the goals selected remain current and appropriate. Table 2 lists the specific cleanup levels assigned to the Site COCs in soil and groundwater listed above. Cleanup goals for groundwater COCs were based upon drinking water standards for potable water aquifers under the Safe Drinking Water Act, and on risk-based determinations from the BRA. For Site soils, although there have been changes made since 1991 to the exposure assumptions EPA uses for assessing risk from soils, they do not apply to the Site because the soil cleanup levels were based on preventing leaching of contaminants to groundwater, rather than risk.

RGs for soil have been met and soil sampling for the Site was discontinued in 2004.

The following COCs had RGs based on MCLs that have not changed since the original 1991 ROD or the 2012 AROD:

Benzene	1,2-*cis*-dichloroethene	1,2-dichloroethane
1,1-dichloroethylene	tetrachloroethene	1,2-*trans*-dichloroethene
methylene chloride	trichloroethene	1,1,1-trichloroethane
1,1,2-trichloroethane	vinyl chloride	

As noted above, the RG for chloroform (not listed here) was modified by the 2012 AROD. The RGs for these 11 compounds are still protective and valid.

Acetone had an RG of 350 µg L established in 1991 ROD. This was a risk-based calculation derived from the estimated potential for noncarcinogenic health effects (referred to as a Hazard Index [HI]). The EPA has determined that exposure to acetone is not expected to cause significant health effects if the HI for the exposure pathway has a total value of 1.0 or less. A recalculation of risks was performed using the oral Reference Dose (RfD) value currently recommended by EPA (IRIS), 0.9 mg kg-day. For the most sensitive receptor, the child resident, the groundwater ingestion risk HI equals 0.0194. This is well below the HI threshold of 1.0. The RG is still protective and valid.

Methyl ethyl ketone (2-butanone) had an RG of 2,000 µg L established in 1991 ROD. This was a risk-based calculation derived from the estimated potential for noncarcinogenic health effects. The EPA has determined that exposure to methyl ethyl ketone is not expected to cause significant health effects if the HI for the exposure pathway has a total value of 1.0 or less. A recalculation of risks was performed using the oral Reference Dose (RfD) value currently recommended by EPA (IRIS), 0.6 mg kg-day. For the most sensitive receptor, the child resident, the groundwater ingestion risk's HI equals 0.000416. This is well below the HI threshold of 1.0. The RG is still protective and valid.

Chloromethane had a RG of 63 µg L established in 1991 ROD. This was a risk-based calculation derived from the HEAST Oral Cancer Slope Factor (CSF) of 1.3×10^{-2} (which has since been withdrawn). A recalculation of risks was performed using the one IRIS-recommended toxicity value, a reference concentration (RfC) 0.09 mg m^3. For the most

sensitive receptor, the child resident, the inhalation risk's hazard quotient equals 0.336. This is well below the hazard quotient threshold of 1.0. The RAO is still protective and valid.

1,1-dichloroethane had an RG of 350 µg L established in 1991 ROD. This was a risk-based calculation derived EPA's Oral Reference Dose of 1 x 10^{-1} mg kg-day with an additional 10-fold safety factor. In 1996, IRIS classified 1,1-DCA as a possible human carcinogen. A recalculation of risks was performed using the revised toxicity values currently recommended by EPA. For the oral CSF, the EPA's OSWER uses the Tier 3 value of 5.7 x 10^{-3} (mg kg-day)$^{-1}$ from California EPA. IRIS provides no oral RfD but recommends using the Tier 3 Provisional Peer Reviewed Toxicity Value of 0.2 mg kg-day (greater than the BRA value used, 0.1 mg kg-day). The calculated risk to the most sensitive receptor, the child resident, at 1.2 x 10^{-4}, is at the upper end of EPA's acceptable risk range and slightly exceeds the cancer risk limit. The current RG is not protective and valid. In light of the new toxicity information, a new risk-based RG should be derived to replace it.

Toxicity values used in the risk calculations described above are provided at Appendix G. Based on the review of Site COCs above, the issue of an appropriate risk-based RG for one COC, 1,1-dichloroethane, will be carried forward.

7.3 Question C: Has any other information come to light that could call into question the protectiveness of the remedy?

Information about an "emerging contaminant" has come to light for consideration at the Site. 1,4-Dioxane is a manmade, highly soluble VOC used as a solvent stabilizer that prevents the breakdown of chlorinated solvents. It is also used in the formulation of dyes. The Site was used by facilities that manufactured dyes; therefore, it is possible that elevated 1,4-dioxane concentrations exist in Site ground water. Current ground water monitoring does not include analysis of this compound. Because this compound readily dissolves in water, it can be found in ground water plumes far in advance of other solvents. Additionally, the remedy selected by the 2012 AROD was not evaluated with respect to potential effectiveness in removing 1,4-dioxane. To rule out that elevated concentrations of the compound are present on Site, it is recommended that sampling be performed to

determine if 1,4-dioxane is present in the Site's ground water. This issue will be carried forward.

7.4 Technical Assessment Summary

The review of documents, ARARs, risk assumptions and the Site inspection indicate that the remedy is functioning as intended by the 2012 AROD. The technical assessment identifies two issues: (1) The potential presence of 1,4-dioxane in groundwater needs to be determined, and (2) the RG for 1,1-dichloroethane needs to be reevaluated and a new risk-based RG should be derived for this COC. These two issues will be carried forward and assigned appropriate recommendations.

8.0 Issues/Recommendations and Follow-up Actions

Table 6 provides recommendations to address the current issues at the Medley Farm Drum Dump Site.

Table 6: Current Issues and Recommendations

Issue	Recommendations/ Follow-Up Actions	Party Responsible	Oversight Agency	Milestone Date	Affects Protectiveness? (Yes or No)	
					Current	Future
1,4-dioxane has not been sampled for in Site groundwater. The potential presence of 1,4-dioxane in groundwater needs to be determined.	Add 1,4-dioxane to list of analytes in selected wells to determine presence/absence in groundwater	PRPs	EPA, State	9/01/2015	NO	YES
Changes have occurred to the applicable risk criteria for 1,1-dichloroethane and the RG is no longer valid.	Reevaluate the RG for 1,1-dichloroethane and derive new site-specific risk-based RG. Modify Site remedy as necessary to include the revised RG.	EPA	EPA, State	9/01/2015	NO	YES

9.0 Protectiveness Statement

The remedy at the Medley Farm Drum Dump Superfund Site currently protects human health and the environment. For the remedy to be protective over the long term, the potential presence of 1,4-dioxane in Site groundwater needs to be determined, and the remedial goal (RG) for 1,1-dichloroethane needs to be revised and updated.

10.0 Next Review

Five-Year Reviews are to be conducted at this Site until contaminant levels are below the cleanup goals established by EPA in Table 1 of the AROD. Because Site contaminant levels remain above cleanup levels, the next Five-Year Review will be completed within five years of the date of this report. The due date for the next Five Year Review will be in September 2019.

Appendix A: List of Documents Reviewed

Date of Document	Document
May 1991	*Record of Decision, Medley Farm Drum Dump Site.* US EPA, Region 4, Atlanta, GA.
August 1993	*Performance Standards Verification Plan.* RMT, Inc., Greenville SC.
December 1993	*Explanation of Significant Differences, Medley Farm Drum Dump Site.* US EPA, Region 4, Atlanta, GA.
July 1999	*First Five-Year Review, Medley Farm Drum Dump Site.* US EPA, Region 4, Atlanta, GA.
June 2004	*Revised Work Plan and Design Report for Reductive Dechlorination.* RMT, Inc., Greenville SC. (Revised: Final version dated August 2004)
September 2004	*Second Five-Year Review, Medley Farm Drum Dump Site.* US EPA, Region 4, Atlanta, GA.
February 2006	*2005 Remedial Action Annual Report.* RMT, Inc., Greenville SC.
March 2007	*2006 Remedial Action Annual Report.* RMT, Inc., Greenville SC.
February 2008	*2007 Remedial Action Annual Report.* RMT, Inc., Greenville SC.
May 2009	Declaration of Covenants and Restrictions: Samuel C. Medley, Deed Book 27, Page 1378. Cherokee County, SC.
September 2009	*Third Five-Year Review, Medley Farm Drum Dump Site.* US EPA, Region 4, Atlanta, GA.
February 2010	Letter, TRC, Inc., Greenville SC, Subject: Status of Supplemental Task Requested from 2009 Five-Year Review Report, Medley Farm Site, Gaffney, SC. TRC, Greenville SC.
April 2010	Filing: Connor (McNair) to US District Court of Greenville, SC. 18th Annual Progress Report per Civil Action Number 6:92-0153-20. McNair Law Firm, P.A., Greenville, SC

Date of Document	Document
August 2010	*2010 Remedial Action Biennial Report, Medley Farm Site.* TRC, Greenville, SC.
September 2010	*Explanation of Significant Differences, Medley Farm Drum Dump Superfund Site.* US EPA, Region 4, Atlanta, GA.
February 2011	Letter, U.S. EPA, to M. Magee, Medley Farm Site Steering Committee, Subject: Approval to Proceed, Additional Infrastructure to Support Enhanced Reductive Dechlorination (ERD) (Supplemental Remedy), Medley Farm Superfund Site, Gaffney, South Carolina.
December 2011	*Focused Feasibility Study, Medley Farm Site, Gaffney, SC.* TRC, Greenville, SC.
September 2011	Memo, Greg Cassidy, SCDHEC, SC. Subject: Meeting with Sam Medley. SCDHEC, Columbia, SC.
August 2012	*Amended Record of Decision, Medley Farm Drum Dump Site.* US EPA, Region 4, Atlanta, GA.
June 2013	*Remedial Action Biennial Report, Medley Farm Site.* TRC, Greenville, SC.
November 2013	Letter, U.S. EPA, to M. Magee, Medley Farm Site Steering Committee, Subject: Review and Comments on the 2012 Biennial RA Progress Report for the Medley Farm Drum Dump Superfund Site, Gaffney, Cherokee County, South Carolina.
April 2014	Filing: Connor (Pruet) to US District Court of Greenville, SC. 18th Annual Progress Report per Civil Action Number 6:92-0153-20. Nexsen Pruet, LLC., Greenville, SC
May 2014	Tables: February 2014 Performance Groundwater Monitoring Results. TRC, Greenville, SC. (Handout Agenda from May 20, 2014 Progress Review Meeting.)
May 2014	Table: February 2014 Surface Water Monitoring Results. TRC, Greenville, SC. (Handout Agenda from May 20, 2014 Progress Review Meeting.)

Appendix B: Press Notice

Public Notice

Medley Farm Drum Dump Site
Cherokee County, South Carolina

The U.S. Environmental Protection Agency (EPA) and the South Carolina Department of Health and Environmental Control (DHEC) are conducting a 5-year review of the Medley Farm Drum Dump Site located at 887 Burnt Gin Road (Highway 72), five miles south of Gaffney. This is a federal Superfund Site with ongoing cleanup activities. The purpose of the review is to evaluate remedial activities of the past five years and make sure that the cleanup continues to protect human health and the environment. During the review, DHEC staff will conduct interviews with local residents, officials, and others who are familiar with the Site. We value input about Site conditions and want to hear any concerns of the local community. **You are encouraged to participate in the review by contacting us with your comments or questions through May 21, 2014.**

The 5-year review process is expected to be complete in fall 2014, at which time a report will be written on our findings. Comments about the Site will be summarized in the report. The report will be available on EPA's webSite and at the Cherokee County Public Library located at 300 East Rutledge Avenue in Gaffney. For more information about this Site, please visit:
http://www.epa.gov/region4/superfund/Sites/npl/southcarolina/medfdrdpsc.html.

For comments, questions, or to participate in an interview, please contact:

Community Involvement: Donna Moye, DHEC Community Liaison, at (803) 898-1382, or by e-mail at moyedd@dhec.sc.gov.

Technical Comments: Ralph Howard, EPA Project Manager, at (404) 562-8829, or by e-mail at howardralph@epa.gov.

Please share this with others you know who might be interested.

D H E C
PROMOTE PROTECT PROSPER
South Carolina Department of Health and Environmental Control

Appendix C: Interview Forms

Interview Form for Five-Year Review

Site Name: Medley Farm Drum Dump
Interviewer's Name: Timothy Kadar **Affiliation:** SCDHEC
Interviewee's Name: Ralph Howard, Project Manager **Affiliation:** EPA, SRSEB
Contact Information: U.S. EPA Region 4
61 Forsyth Street
Atlanta, GA 30303
Howard.ralph@epa.gov
P: 404-562-8829

Type of Interview: Email
Date: 6/11/2014

1. What is your overall impression of the project, including cleanup, maintenance and reuse activities (as appropriate)?
   My sense is that the cleanup project is going well, if slower than both EPA and the Potentially Responsible Parties (PRPs) would like. Use of Enhanced Reductive Dechlorination (ERD) has worked fairly well but not yet treated the affected groundwater down to the cleanup goals.

2. What is your assessment of the current performance of the remedy in place at the Site?
   Successful overall. The remedy (ERD, and SVE plus pump-and-treat prior to that) has removed the great mass of the onSite contamination from soil and groundwater. In recent years, remedy implementation (injections using ERD) has lowered the amount of Site contaminants in groundwater even further, to the point that only a handful of wells are above standards for the Site contaminants.

3. Are you aware of any complaints or inquiries regarding Site-related environmental issues or remedial activities from residents in the past five years?
   No, there have been no complaints from residents, that I'm aware of.

4. Has your office conducted any Site-related activities or communications in the past five years? If so, please describe the purpose and results of these activities.
   Given my position as EPA's project manager, the question kind of misses the mark…But in the sense of public activities, as is suggested here, all of Region 4's work has been conducted through communications with the Site PRPs' consultant, TRC, and SCDHEC staff personnel.

5. Are you aware of any changes to state laws that might affect the protectiveness of the Site's remedy?
   No.

6. Are you comfortable with the status of the institutional controls at the Site? If not, what are the associated outstanding issues?
   I am comfortable with the ICs in place. I am not aware of any outstanding issues.

7. Are you aware of any changes in projected land use(s) at the Site?
   No, I'm not aware of any recent or expected changes. In 2009, at the time of the 5YR. a county official stated that almost all of the land development was occurring out near the I-85 interstate highway.

8. Do you have any comments, suggestions or recommendations regarding the management or operation of the Site's remedy?
   In general, no major comments. There is one issue that came up recently which is the sometimes-unrecognized presence of 1,4-dioxane at groundwater Sites. 1,4 was used as a stabilizer for trichloroethane (TCA), and at Medley one saprolite well (SW-4) did have between 2500 and 3400

PPBs 1,1,1-TCA in 1989-90. Current SW-4 levels are <4 PPB for both 1,1,1- and 1,1,2 TCA. However, 1,4-dioxane could be present nonetheless, although significant levels would not be expected. This issue should be considered; sampling for it at least at SW-4 might be warranted. Otherwise, groundwater cleanup efforts continue.

Interview Form for Five-Year Review

Site Name: Medley Farm Drum Dump
Interviewer's Name: Timothy Kadar **Affiliation:** SCDHEC
Interviewee's Name: Greg Cassidy, Project Manager **Affiliation:** SCDHEC
Contact Information: 2600 Bull Street
Columbia, SC 29201
cassidga@dhec.sc.gov
P: 803.898.0910
Type of Interview: Email
Date:

1. What is your overall impression of the project, including cleanup, maintenance and reuse activities (as appropriate)? *The ERD Remedy is working as designed. The goal of the current remedy is to transition to MNA as Site conditions allow. This transition will not be a sudden 'Site-wide' move, but more of a well-by-well transition based on criteria developed between the EPA, SCDHEC, and the PRP. There have been no maintenance issues since the last 5 Year Review. Reuse activities have not been discussed.*

2. What is your assessment of the current performance of the remedy in place at the Site? *The remedy is working as designed. The injections have been optimized through the addition of 4 wells in 2011. Further optimization may be needed based on monitoring data.*

3. Are you aware of any complaints or inquiries regarding Site-related environmental issues or remedial activities from residents in the past five years? *No*

4. Has your office conducted any Site-related activities or communications in the past five years? If so, please describe the purpose and results of these activities. *Several Site visits have been conducted to observe sampling methodology used at the Site.*

5. Are you aware of any changes to state laws that might affect the protectiveness of the Site's remedy? *No*

6. Are you comfortable with the status of the institutional controls at the Site? If not, what are the associated outstanding issues? *Yes*

7. Are you aware of any changes in projected land use(s) at the Site? *No*

8. Do you have any comments, suggestions or recommendations regarding the management or operation of the Site's remedy? *Continued refinement/optimization of ERD injections (locations, timing, and amounts) will continue the transition towards MNA.*

Medley Farm Drum Dump Site
Gaffney, Cherokee County, South Carolina
Five-Year Review Interview Form

Site Name: See above. **EPA ID No.:**

Interviewer Name: Donna Moye **Affiliation:** SC DHEC

Subject Name: John Goode **Affiliation:** Site Property Owner

Subject Contact Information: 902 Burnt Gin Road
Gaffney, SC 29340
(864) 490-5968

Time: 11:30 a.m. **Date:** August 8, 2014
Interview Location:

Interview Format (circle one): In Person Phone X Mail Other:

Interview Category: Resident / Property Owner

1. Are you aware of the former environmental issues at the Site and the cleanup activities that have taken place to date?

   Mr. Goode is aware of the environmental issues and cleanup activities that have taken place on his property.

2. What is your overall impression of the project; including cleanup, maintenance, and reuse activities (as appropriate)?

   Mr. Goode feels that the property is being monitored satisfactorily. He has no complaints.

3. What have been the effects of this Site on surrounding community, if any? Are you aware of any complaints or inquiries regarding site-related environmental issues or remedial activities from residents in the past five years?

   Mr. Goode feels that the local community is aware of the environmental history of the site and has not been adversely affected by it. He has not personally received any questions or complaints from his neighbors about the property.

4. Have there been any problems with unusual or unexpected activities at the Site, such as emergency response, vandalism or trespassing?

He has not observed any unusual activities at the site and is not aware of any trespassing issues.

5. Should the EPA do more to keep involved parties and surrounding neighbors informed of site activities? What methods would you recommend?

   Mr. Goode feels that he has been kept informed by both EPA and DHEC. Mr. Goode further stated that he had the contact information for federal/state officials should any issues arise. He had no other recommendations for sharing information with the local community.

6. Do you own a private well in addition to, or instead of, accessing city/municipal water supplies? If so, for what purpose(s) is your private well used?

   No, his water is supplied by the city.

7. Are you aware of any changes in projected land use(s) at or near the Site?

   Mr. Goode stated that he would like to sell the property within the next three months.

Additional Notes (if any):

None.

Interview Form for Five-Year Review

Site Name: Medley Farm Drum Dump
Interviewer's Name: Timothy Kadar **Affiliation:** SCDHEC
Interviewee's Name: Charles Mathis Jr. **Affiliation:** District 5 Cherokee County Council
Contact Information: 864.489.9960
Type of Interview: Phone
Date: March 27, April 4, June 11, 2014 - attempted contact; no response

Interview Category: Local Government

1. Are you aware of the environmental issues and/or cleanup activities at the Medley Farm Drum Dump Site?

2. What are your views or concerns about Site conditions, problems, or related concerns?

3. Are you aware of any complaints or inquiries regarding Site-related environmental issues or remedial activities from residents in the past five years?

4. What effect has this Site had on the surrounding community?

5. Are you aware of any changes to state laws that might affect the protectiveness of the Site's remedy?

6. Are you aware of any changes in projected land use(s) at or near the Site?

7. Do you have any comments, suggestions or recommendations regarding the management or operation of the Site's remedy?

Appendix D: Site Inspection Checklist

FIVE-YEAR REVIEW SITE INSPECTION CHECKLIST

I. SITE INFORMATION

Site Name: Medley Farm Drum Dump	**Date of Inspection: April 1, 2014**
Location and Region: Gaffney, Cherokee County, SC, Region 4	**EPA ID: SCD980558142**
Agency, Office or Company Leading the Five-Year Review: SCDHEC	**Weather/Temperature: 70 and sunny**

Remedy Includes: (Check all that apply)

- ☐ Landfill cover containment
- ☐ Access controls
- ☒ Institutional controls
- ☒ Ground water pump and treatment
- ☐ Surface water collection and treatment
- ☐ Other:
- ☒ Monitored natural attenuation
- ☐ Ground water containment
- ☐ Vertical barrier walls

Attachments: ☐ Inspection team roster attached ☐ Site map attached

II. INTERVIEWS (check all that apply)

1. **O&M Site Manager** _____ (Name) _____ (Title) mm dd yyyy (Date)
   Interviewed ☐ at Site ☐ at office ☐ by phone Phone: _____
   Problems, suggestions ☐ Report attached: Appendix C includes interview forms for FYR.
2. **O&M Staff** _____ (Name) _____ (Title) mm dd yyyy (Date)
   Interviewed ☐ at Site ☐ at office ☐ by phone Phone: _____
   Problems suggestions ☐ Report attached: _____

3. **Local Regulatory Authorities and Response Agencies** (i.e., state and tribal offices, emergency response office, police department, office of public health or environmental health, zoning office, recorder of deeds, or other city and county offices). Fill in all that apply.

Agency EPA Region 4

Contact	Name	Title	Date	Phone No.
	Ralph Howard	Remedial Project Manager	06/11/2014	(404) 562-8829

Problems/suggestions ☐ Report attached: Appendix C includes interview forms for FYR

Agency SCDHEC

Contact	Name	Title	Date	Phone No.
	Greg Cassidy	Environmental Engineer	_____	(803) 898-0910

Problems/suggestions ☐ Report attached: Appendix C includes interview forms for FYR

Agency _____

Contact	Name	Title	Date	Phone No.
	_____	_____	_____	_____

Problems/suggestions ☐ Report attached: _____

Agency _____

Contact	Name	Title	Date	Phone No.
	_____	_____	_____	_____

Problems/suggestions ☐ Report attached: _____

Agency _____

Contact	Name	Title	Date	Phone No.
	_____	_____	_____	_____

Problems/suggestions ☐ Report attached: _____

4. **Other Interviews** (optional) ☐ Report attached:

III. ON-SITE DOCUMENTS AND RECORDS VERIFIED (check all that apply)

1. **O&M Documents**

☒ O&M manual	☒ Readily available	☒ Up to date	☐ N/A
☐ As-built drawings	☐ Readily available	☐ Up to date	☐ N/A
☒ Maintenance logs	☒ Readily available	☒ Up to date	☐ N/A

Remarks: _____

2. **Site-Specific Health and Safety Plan** ☒ Readily available ☒ Up to date ☐ N/A

☒ Contingency plan/emergency response plan ☒ Readily available ☒ Up to date ☐ N/A

Remarks: All documents were available and current.

3. **O&M and OSHA Training Records** ☒ Readily available ☒ Up to date ☐ N/A

Remarks: _____

4.	**Permits and Service Agreements**			
	☐ Air discharge permit	☐ Readily available	☐ Up to date	☒ N A
	☐ Effluent discharge	☐ Readily available	☐ Up to date	☒ N A
	☐ Waste disposal, POTW	☐ Readily available	☐ Up to date	☐ N A
	☒ Other permits: NPDES	☒ Readily available	☒ Up to date	☐ N A
	Remarks: _____			
5.	**Gas Generation Records**	☐ Readily available	☐ Up to date	☒ N A
	Remarks: _____			
6.	**Settlement Monument Records**	☐ Readily available	☐ Up to date	☒ N A
	Remarks: _____			
7.	**Ground Water Monitoring Records**	☒ Readily available	☒ Up to date	☐ N A
	Remarks: _____			
8.	**Leachate Extraction Records**	☐ Readily available	☐ Up to date	☒ N A
	Remarks: _____			
9.	**Discharge Compliance Records**			
	☐ Air	☐ Readily available	☐ Up to date	☒ N A
	☒ Water (effluent)	☒ Readily available	☒ Up to date	☐ N A
	Remarks: _____			
10.	**Daily Access/Security Logs**	☐ Readily available	☐ Up to date	☒ N A
	Remarks: _____			

IV. O&M COSTS

1.	**O&M Organization**	
	☐ State in-house	☐ Contractor for state
	☐ PRP in-house	☒ Contractor for PRP
	☐ Federal facility in-house	☐ Contractor for Federal facility
	☐ _____	

2. **O&M Cost Records**

☐ Readily available ☐ Up to date

☐ Funding mechanism agreement in place ☒ Unavailable

Original O&M cost estimate: _____ ☐ Breakdown attached

Total annual cost by year for review period if available

From: mm dd yyyy	To: mm dd yyyy	_____	☐ Breakdown attached
Date	Date	Total cost	
From: mm dd yyyy	To: mm dd yyyy	_____	☐ Breakdown attached
Date	Date	Total cost	
From: mm dd yyyy	To: mm dd yyyy	_____	☐ Breakdown attached
Date	Date	Total cost	
From: mm dd yyyy	To: mm dd yyyy	_____	☐ Breakdown attached
Date	Date	Total cost	
From: mm dd yyyy	To: mm dd yyyy	_____	☐ Breakdown attached
Date	Date	Total cost	

3. **Unanticipated or Unusually High O&M Costs during Review Period**

Describe costs and reasons: _____

V. ACCESS AND INSTITUTIONAL CONTROLS ☒ Applicable ☐ N A

A. Fencing

1. **Fencing Damaged** ☐ Location shown on Site map ☐ Gates secured ☒ N A

Remarks:

B. Other Access Restrictions

1. **Signs and Other Security Measures** ☐ Location shown on Site map ☐ N A

Remarks: Signs are posted (Keep Out, No Trespassing) only at main (887) and southern roadway entrances on Burnt Gin. No other signage present, but vandalism trespass has not been observed at Site.

C. Institutional Controls (ICs)

1. **Implementation and Enforcement**

Site conditions imply ICs not properly implemented ☐ Yes ☒ No ☐ N A

Site conditions imply ICs not being fully enforced ☐ Yes ☒ No ☐ N A

Type of monitoring (e.g., self-reporting, drive by): Self-reporting

Frequency: Every sampling event – up to quarterly

Responsible party agency: PRP

Contact _____ _____ mm dd yyyy _____

Name Title Date Phone no.

Reporting is up to date ☐ Yes ☐ No ☐ N A

Reports are verified by the lead agency ☐ Yes ☐ No ☐ N A

Specific requirements in deed or decision documents have been met ☐ Yes ☐ No ☐ N A

Violations have been reported ☐ Yes ☐ No ☐ N A

Other problems or suggestions: ☐ Report attached

2. **Adequacy** ☒ ICs are adequate ☐ ICs are inadequate ☐ N A

Remarks: _____

D. General

1. **Vandalism/Trespassing** ☐ Location shown on Site map ☐ No vandalism evident

Remarks: Illegal dumping of a 5-gallon bucket labeled hydraulic oil near Jones Creek. However, apparently caused by main Site property (65 acres) owner.

2. **Land Use Changes On Site** ☒ N A

Remarks: Land clearing activities observed; dirt roads have been pushed in to southern portion of Site since 2009 5YR.

3. **Land Use Changes Off Site** ☒ N A

Remarks: _____

VI. GENERAL SITE CONDITIONS

A. Roads ☒ Applicable ☐ N A

1. **Roads Damaged** ☐ Location shown on Site map ☒ Roads adequate ☐ N A

Remarks: _____

B. Other Site Conditions

Remarks: _____

VII. GROUND WATER/SURFACE WATER REMEDIES ☒ Applicable ☐ N A

A. Ground Water Extraction Wells, Pumps and Pipelines ☒ Applicable ☐ N A

1. **Pumps, Wellhead Plumbing and Electrical**

☒ Good condition ☒ All required wells properly operating ☐ Needs maintenance ☐ N A

Remarks: _____

2. **Extraction System Pipelines, Valves, Valve Boxes and Other Appurtenances**

☒ Good condition ☐ Needs maintenance

Remarks: _____

3. **Spare Parts and Equipment**

☒ Readily available ☒ Good condition ☐ Requires upgrade ☐ Needs to be provided

Remarks: _____

B. Surface Water Collection Structures, Pumps and Pipelines ☐ Applicable ☒ N A

1. **Collection Structures, Pumps and Electrical**

☐ Good condition ☐ Needs maintenance

Remarks: _____

2. **Surface Water Collection System Pipelines, Valves, Valve Boxes and Other Appurtenances**

☐ Good condition ☐ Needs maintenance

Remarks: _____

3. **Spare Parts and Equipment**

☐ Readily available ☐ Good condition ☐ Requires upgrade ☐ Needs to be provided

Remarks: _____

C. Treatment System ☒ Applicable ☐ N A

1. **Treatment Train** (check components that apply)

☐ Metals removal ☐ Oil water separation ☐ Bioremediation

☐ Air stripping ☐ Carbon adsorbers

☐ Filters: _____

☒ Additive (e.g., chelation agent, flocculent): lactate injection via injection wells

☐ Others: _____

☒ Good condition ☐ Needs maintenance

☐ Sampling ports properly marked and functional

☐ Sampling maintenance log displayed and up to date

☐ Equipment properly identified

☐ Quantity of ground water treated annually: _____

☐ Quantity of surface water treated annually: _____

Remarks: _____

2. **Electrical Enclosures and Panels** (properly rated and functional)

☐ N A ☒ Good condition ☐ Needs maintenance

Remarks: _____

3. **Tanks, Vaults, Storage Vessels**

☐ N A ☒ Good condition ☒ Proper secondary containment ☐ Needs maintenance

Remarks: _____

4. **Discharge Structure and Appurtenances**

☐ N A ☒ Good condition ☐ Needs maintenance

Remarks: _____

5. **Treatment Building(s)**

☐ N A ☒ Good condition (esp. roof and doorways) ☐ Needs repair

☐ Chemicals and equipment properly stored

Remarks: _____

6. **Monitoring Wells** (pump and treatment remedy)

☒ Properly secured/locked ☒ Functioning ☒ Routinely sampled ☒ Good condition

☐ All required wells located ☐ Needs maintenance ☐ N A

Remarks: Any faulty lock, broken hinge, etc., etc., were noted during Site inspection and scheduled to fixed ASAP.

D. Monitoring Data

1. **Monitoring Data**

☒ Is routinely submitted on time ☒ Is of acceptable quality

2. **Monitoring Data Suggests:**

☒ Ground water plume is effectively contained ☒ Contaminant concentrations are declining

E. Monitored Natural Attenuation

1. **Monitoring Wells** (natural attenuation remedy)

☐ Properly secured/locked ☐ Functioning ☐ Routinely sampled ☐ Good condition

☐ All required wells located ☐ Needs maintenance ☒ N A

Remarks: _____

VIII. OTHER REMEDIES

If there are remedies applied at the Site and not covered above, attach an inspection sheet describing the physical nature and condition of any facility associated with the remedy. An example would be soil vapor extraction.

IX. OVERALL OBSERVATIONS

A. Implementation of the Remedy

	Describe issues and observations relating to whether the remedy is effective and functioning as designed. Begin with a brief statement of what the remedy is designed to accomplish (e.g., to contain contaminant plume, minimize infiltration and gas emissions). Remedy is designed to reduce groundwater contaminants to remedial goals. 1,4-dioxane may be a contaminant of concern in groundwater. Sampling for 1,4-dioxane in selected wells will determine presence or absence of in groundwater.
B.	**Adequacy of O&M**
	Describe issues and observations related to the implementation and scope of O&M procedures. In particular, discuss their relationship to the current and long-term protectiveness of the remedy. There are no known O&M issues.
C.	**Early Indicators of Potential Remedy Problems**
	Describe issues and observations such as unexpected changes in the cost or scope of O&M or a high frequency of unscheduled repairs that suggest that the protectiveness of the remedy may be compromised in the future. There are no known early indications of potential remedy problems.
D.	**Opportunities for Optimization**
	Describe possible opportunities for optimization in monitoring tasks or the operation of the remedy. There are no known opportunities for optimization.

Appendix E: Groundwater Monitoring Data

Summary of Biennial Surface Water Quality Results

PARAMETER[1]	STATION/SAMPLE DATE								
	SWS-1			SWS-2			SWS-3		
	06/30/08	01/23/09	03/18/10	06/30/08	01/23/09	03/18/10	06/30/08	01/23/09	3/18/2010
VOCs									
1,1,1-TCA	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
1,1,2-TCA	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
1,1-DCA	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
1,1-DCE	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
1,2-DCA	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
2-Butanone	<0.005	<0.02L1	<0.02	<0.005	<0.02L1	<0.02	<0.005	<0.02L1	<0.02
Acetone	<0.005L3	<0.02L1	<0.02	<0.005L3	<0.02L1	<0.02	<0.005L3	<0.02L1	<0.02
Benzene	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Chloroethane	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Chloroform	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
Chloromethane	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
cis-1,2-DCE	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Methylene chloride	<0.001	<0.001	<0.001	<0.001	<0.001	<0.00045Z3Ju	<0.001	<0.001	<0.00049Z3Ju
PCE	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
trans-1,2-DCE	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
TCE	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Vinyl chloride	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Field Parameters									
Conductance, specific (µs/cm)	64.0	55.2	52	73.4	57	56	74.1	138	47
pH (s.u.)	6.97	7.33	7.60	6.82	7.27	7.58	6.62	7.30	7.45
Temperature (°C)	22.9	6.4	13.00	24.3	6.10	13.09	22.9	8.50	13.46

(1) Analytical results are reported in mg/L unless otherwise noted.

< Concentration less than the Quantitation Limit or not validated if accompanied by "u" qualifier.

J Estimated concentration above the adjusted method detection limit and below the adjusted reporting limit.

L1 Analyte recovery in the laboratory control sample was above the QC limits. Results may be biased high.

L3 Analyte recovery in the LCS exceeded QC limits. Analyte presence below reporting limits in associated samples. Results unaffected by high bias.

Z3 Methylene Chloride is a common laboratory contaminant. Results for this analyte should be considered estimated unless the amount found in the sample is 3 to 5 times higher than that found in the method blank.

NA Not analyzed.

Groundwater Monitoring Results

PARAMETER[1]	GROUNDWATER CLEAN-UP GOAL[2]	A-3		A-5			A-6		B-1	
		12/03/12	6/13/2013	12/04/12	(DU-12401) 12/04/12	6/12/2013	12/04/12	6/12/2013	11/28/12	6/13/2013
VOCs										
1,1,1-TCA	0.2	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
1,1,2-TCA	0.005	**0.0024**	**0.0025**	**0.0019**	**0.0017**	**0.0018**	<0.001	**0.00055 J**	<0.001	<0.001
1,1-DCA	0.35	<0.001	**0.00066 J**	<0.001	<0.001	**0.00039 J**	<0.001	<0.001	<0.001	**0.00063 J**
1,1-DCE	0.007	**0.0029**	**0.003**	**0.0037**	**0.0033**	**0.0029**	**0.0023**	**0.00097 J**	<0.001	**0.0015**
1,2-DCA	0.005	**0.00053J**	<0.001	**0.0021**	0.0022	<0.001	**0.0015**	**0.00073 J**	**0.0028**	**0.0017**
2-Butanone	2	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
Acetone	0.35	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
Benzene	0.005	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Chloroethane	--	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Chloroform	0.1	**0.004J**	**0.0038 J**	**0.0025J**	**0.0026J**	**0.0075**	<0.005	<0.005	<0.005	<0.005
Chloromethane	0.063	<0.001	<0.001	<0.001	**0.00032J**	<0.001	<0.001	<0.001	<0.001	<0.001
cis-1,2-DCE	0.07	**0.0198**	**0.0217**	**0.0424**	**0.039**	**0.027**	**0.032**	**0.0205**	**0.0092**	**0.0137**
Methylene chloride	0.005	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
PCE	0.005	**0.0146**	**0.0165**	**0.0284**	**0.0232**	**0.0462**	<0.001	**0.0039**	<0.001	<0.001
trans-1,2-DCE	0.1	<0.001	**0.00063 J**	**0.0012**	0.0012	**0.00093 J**	<0.001	**0.0015**	<0.001	**0.00047 J**
TCE	0.005	**0.0292**	**0.0314**	**0.0635**	**0.06**	**0.0786**	**0.0126**	**0.0299**	**0.00051J**	**0.0025**
VC	0.002[3]	<0.001	<0.001	**0.0144**	**0.012**	**0.00036 J**	**0.0093**	**0.0011**	**0.0218**	**0.0095**
Field Parameters										
Conductance, specific (µmhos/cm @ 25°C)	--	146	156	162	NA	154	217	209	180	176
DO (mg/L)	--	1.03	1.95	0.41	NA	2.24	0.20	0.83	0.23	0.63
FE^{+2}, dissolved (ppm)	--	0	NA	0.1	NA	NA	0.3	NA	0.8	NA
ORP (mV)	--	130	160.7	70	NA	146.0	30	49.3	-14	-52.2
pH (s.u.)	--	6.12	5.91	5.68	NA	5.85	5.94	6.13	6.28	6.01
Temperature (°C)	--	16.83	19.35	16.54	NA	17.80	17.42	17.65	17.77	20.34

(1) Analytical results are reported in milligrams per liter (mg/L) unless otherwise noted.
(2) Amended Record of Decision, USEPA, August 2012
(3) State Primary Drinking Water Regulations: R.61-58 (SC DHEC; August 28, 2009).
(4) DO level anamolously high for groundwater environment.
J Estimated concentration above the adjusted method detection limit and below the adjusted reporting limit.
j- Concentration considered an estimate biased low based on data validation.
u Laboratory reported detection not validated during data validation process.
uj Not detected; quantitation limit may be inaccurate or imprecise.
M0 Matrix spike recovery and/or matrix spike duplicate recovery was outside laboratory control limits.
NA Not analyzed.
Bolding indicates constituent detection in laboratory analyses.
Shading indicates concentration exceeds comparison criteria.

Groundwater Monitoring Results

PARAMETER[1]	GROUNDWATER CLEAN-UP GOAL[2]	DP-3-2	
		12/05/12	6/17/2013
VOCs			
1,1,1-TCA	0.2	<0.004	<0.0025
1,1,2-TCA	0.005	**0.0085**	**0.0079**
1,1-DCA	0.35	<0.004	**0.001 J**
1,1-DCE	0.007	**0.0069**	**0.008**
1,2-DCA	0.005	**0.0789**	**0.0209**
2-Butanone	2	<0.08	<0.05
Acetone	0.35	<0.08	<0.05
Benzene	0.005	<0.004	<0.0025
Chloroethane	--	<0.004	<0.0025
Chloroform	0.1	<0.02	<0.0125
Chloromethane	0.063	**0.0018J**	<0.0025
cis-1,2-DCE	0.07	**0.338**	**0.377**
Methylene chloride	0.005	<0.004	<0.0025
PCE	0.005	**0.0096**	**0.0155**
trans-1,2-DCE	0.1	**0.0059**	**0.006**
TCE	0.005	**0.0429**	**0.0661**
VC	0.002[3]	**0.0611**	**0.029**
Field Parameters			
Conductance, specific (µmhos/cm @ 25°C)	--	208	215
DO (mg/L)	--	0.10	0.54
FE^{+2}, dissolved (ppm)	--	0.2	NA
ORP (mV)	--	22	28.4
pH (s.u.)	--	6.23	5.99
Temperature (°C)	--	18.36	19.44

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(3) State Primary Drinking Water Regulations: R.61-58 (SC DHEC; August 28, 2009).
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j- Concentration considered an estimate biased low based on data validation.
u Laboratory reported detection not validated during data validation process.
uj Not detected; quantitation limit may be inaccurate or imprecise.
M0 Matrix spike recovery and/or matrix spike duplicate recovery was outside laboratory control limits.
NA Not analyzed.
Bolding indicates constituent detection in laboratory analyses.
Shading indicates concentration exceeds comparison criteria.

Groundwater Monitoring Results

PARAMETER[1]	GROUNDWATER CLEAN-UP GOAL[2]	BW-301			C-1		C-2		C-3		
		BW-301 12/06/12	BW-301 6/17/2013	13202) 6/17/2013	12/06/12	6/18/2013	12/06/12	6/18/2013	12/10/12	(DU-12402) 12/10/12	6/18/2013
VOCs											
1,1,1-TCA	0.2	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
1,1,2-TCA	0.005	<0.001	<0.001	<0.001	**0.0014**	**0.0028**	<0.001	<0.001	<0.001	<0.001	<0.001
1,1-DCA	0.35	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
1,1-DCE	0.007	<0.001	<0.001	<0.001	**0.0012**	**0.0011**	<0.001	<0.001	<0.001	<0.001	<0.001
1,2-DCA	0.005	<0.001	<0.001	<0.001	**0.0018**	**0.0019**	**0.00059J**	**0.0006 J**	**0.00053J**	**0.00044J**	<0.001
2-Butanone	2	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
Acetone	0.35	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
Benzene	0.005	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Chloroethane	--	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Chloroform	0.1	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
Chloromethane	0.063	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
cis-1,2-DCE	0.07	**0.0153**	<0.001	<0.001	**0.101**	**0.122**	**0.00084J**	**0.0014**	<0.001	<0.001	**0.002**
Methylene chloride	0.005	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
PCE	0.005	**0.00081J**	<0.001	<0.001	**0.0072**	**0.0171**	**0.0013**	**0.0019**	<0.001	<0.001	<0.001
trans-1,2-DCE	0.1	**0.0016**	<0.001	<0.001	**0.0061**	**0.0025**	**0.0054**	**0.0066**	**0.0055**	**0.0055**	**0.0041**
TCE	0.005	<0.001	<0.001	<0.001	**0.0156**	**0.0131**	<0.001	<0.001	<0.001	<0.001	<0.001
VC	0.002[3]	**0.0388**	<0.001	<0.001	**0.0477**	**0.0411**	**0.0011**	**0.0072**	**0.0015**	**0.0014**	**0.0057**
Field Parameters											
Conductance, specific (µmhos/cm @ 25°C)	--	417	326	NA	331	314	334	316	358	NA	319
DO (mg/L)	--	0.0	0.55	NA	0.0	0.60	0.0	0.57	0.0	NA	0.46
FE^{+2}, dissolved (ppm)	--	0.4	NA	NA	1.0	NA	2	NA	2	NA	NA
ORP (mV)	--	-114	-95.7	NA	-117	-84.9	-139	-102.1	-138	NA	-105.6
pH (s.u.)	--	7.45	7.21	NA	7.15	6.66	7.35	6.90	7.27	NA	6.84
Temperature (°C)	--	15.56	19.20	NA	15.68	21.65	17.39	19.91	17.12	NA	18.34

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(3) State Primary Drinking Water Regulations: R.61-58 (SC DHEC; August 28, 2009).
(4) DO level anamolously high for groundwater environment.
J Estimated concentration above the adjusted method detection limit and below the adjusted reporting limi
j- Concentration considered an estimate biased low based on data validation.
u Laboratory reported detection not validated during data validation process.
uj Not detected; quantitation limit may be inaccurate or imprecise.
M0 Matrix spike recovery and/or matrix spike duplicate recovery was outside laboratory control limits.
NA Not analyzed.
Bolding indicates constituent detection in laboratory analyses.
Shading indicates concentration exceeds comparison criteria.

2012 Performance Monitoring Groundwater Results

PARAMETER[1]	GROUNDWATER CLEAN-UP GOAL[2]	SAMPLE LOCATION/DATE						
		MW-4-2 12/13/12	SW-101 12/14/12	SW-108 12/07/12	SW-201 12/07/12	SW-202 12/10/12	SW-3 12/10/12	SW-4 12/14/12
VOCs								
1,1,1-TCA	0.2	<0.001	<0.001	<0.001	<0.001	<0.001	<0.004	**0.0041**
1,1,2-TCA	0.005	<0.001	<0.001	<0.001	<0.001	<0.001	<0.004	**0.002**
1,1-DCA	0.35	<0.001	<0.001	<0.001	<0.001	<0.001	<0.004	**0.0011**
1,1-DCE	0.007	<0.001	<0.001	<0.001	<0.001	<0.001	<0.004	**0.0151**
1,2-DCA	0.005	**0.0022**	<0.001	<0.001	<0.001	<0.001	<0.004	**0.00058J**
2-Butanone	2	<0.02	<0.02	<0.02	<0.02	<0.02	<0.08	<0.02
Acetone	0.35	<0.02	<0.02	<0.02	<0.02	<0.02	<0.08	<0.02
Benzene	0.005	<0.001	<0.001	<0.001	<0.001	<0.001	<0.004	<0.001
Chloroethane	--	<0.001	<0.001	<0.001	<0.001	<0.001	<0.004	<0.001
Chloroform	0.1	<0.005	<0.005	<0.005	<0.005	<0.005	<0.02	**0.0074**
Chloromethane	0.063	<0.001	<0.001	<0.001	<0.001	<0.001	<0.004	<0.001
cis-1,2-DCE	0.07	**0.0076**	**0.0009J**	**0.004**	<0.001	<0.001	**0.0069**	<0.001
Methylene chloride	0.005	<0.001	<0.001	<0.001	<0.001	<0.001	<0.004	<0.001
PCE	0.005	<0.001	<0.001	**0.0185**	**0.0018**	**0.0018**	**0.368**	**0.0031**
trans-1,2-DCE	0.1	<0.001	<0.001	<0.001	<0.001	<0.001	<0.004	<0.001
TCE	0.005	**0.00049J**	**0.0019**	**0.0213**	**0.0023**	**0.00075J**	**0.245**	**0.0298**
VC	0.002[3]	**0.0118**	<0.001	<0.001	<0.001	<0.001	<0.004	<0.001
Metals								
Manganese, dissolved	--	**3.63**	**0.0295**	**0.0065**	**0.0318**	**0.148**	**0.0066**	**0.0675**
Wet Chemistry								
Bromide	--	NA	NA	**0.45**	NA	NA	NA	NA
Sulfate	--	**3.8J**	**4.8**	**3.2J**	**3.5J**	**3.1J**	<4.0	<4.0
VFAs								
Acetic Acid	--	<2.2Ju	<5	<2.5Ju	<2.2Ju	<2.2Ju	<2.3Ju	<5
Butyric Acid	--	<5	<5	<5	<5	<5	<5	<5
Lactic Acid	--	<25	<25	<25	<25	<25	<25	<25
Propionic Acid	--	<5	<5	<5	<5	<5	<5	<5
Pyruvic Acid	--	<10	<10	<10	<10	<10	<10	<10
Field Parameters								
Conductance, specific (µmhos/cm @ 25°C)	--	254	211	113	136	81	226	125
DO (mg/L)	--	0.14	12.89[4]	1.35	7.84	12.45[4]	5.84	15.30[4]
FE^{+2}, dissolved (ppm)	--	1	0.1	0	0	0	0	0
ORP (mV)	--	-30	55	148	164	190	-82	99
pH (s.u.)	--	6.54	6.74	5.69	5.78	5.95	6.89	6.08
Temperature (°C)	--	17.26	17.97	15.66	15.16	15.40	16.88	15.73

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(4) DO level anamolously high for groundwater environment.

J Estimated concentration above the adjusted method detection limit and below the adjusted reporting limit.

j- Concentration considered an estimate biased low based on data validation.

u Laboratory reported detection not validated during data validation process.

uj Not detected; quantitation limit may be inaccurate or imprecise.

M0 Matrix spike recovery and/or matrix spike duplicate recovery was outside laboratory control limits.

NA Not analyzed.

Bolding indicates constituent detection in laboratory analyses.

Shading indicates concentration exceeds comparison criteria.

2012 Performance Monitoring Groundwater Results

PARAMETER[1]	GROUNDWATER CLEAN-UP GOAL[2]	SAMPLE LOCATION/DATE															
		BW-2 12/10/12	BW-301 12/06/12	BW-3 12/05/12	BW-3 12/28/12	C-1 12/06/12	C-2 12/06/12	C-3 (DU-12402) 12/10/12	C-3 12/10/12	DP-2-1 12/05/12	DP-3-1 12/05/12	DP-3-2 12/05/12	MLW-1-4 12/14/12	MW-2-1 12/13/12	MW-2-2 12/13/12	MW-3D 12/10/12	MW-4-1 12/13/12
VOCs																	
1,1,1-TCA	0.2	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.004	<0.001	<0.001	<0.001	<0.001	<0.001
1,1,2-TCA	0.005	<0.001	<0.001	<0.001	<0.001	**0.0014**	<0.001	<0.001	<0.001	<0.001	**0.005**	**0.0085**	<0.001	<0.001	**0.002**	**0.00098J**	<0.001
1,1-DCA	0.35	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	**0.0013**	<0.004	<0.001	<0.001	<0.001	**0.0008J**	<0.001
1,1-DCE	0.007	<0.001	<0.001	<0.001	<0.001	**0.0012**	<0.001	<0.001	<0.001	<0.001	**0.0018**	**0.0069**	<0.001	<0.001	**0.0021**	<0.001	<0.001
1,2-DCA	0.005	<0.001	<0.001	<0.001	<0.001	**0.0018**	**0.00059J**	**0.00044J**	**0.00053J**	<0.001	**0.0099**	**0.0789**	<0.001	**0.00072J**	**0.00078J**	**0.0023**	**0.00082J**
2-Butanone	2	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.08	<0.02	<0.02	<0.02	<0.02	<0.02
Acetone	0.35	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.08	<0.02	<0.02	<0.0137Ju	<0.02	<0.02
Benzene	0.005	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.004	<0.001	<0.001	<0.001	<0.001	<0.001
Chloroethane	--	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.004	<0.001	<0.001	<0.001	<0.001	<0.001
Chloroform	0.1	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.02	<0.005	<0.005	<0.005	<0.005	<0.005
Chloromethane	0.063	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	**0.0018J**	<0.001	<0.001	<0.001	<0.001	<0.001
cis-1,2-DCE	0.07	**0.0021**	**0.0153**	<0.001	<0.001	**0.101**	**0.00084J**	<0.001	<0.001	**0.0288**	**0.049**	**0.338**	<0.001	**0.00087J**	**0.0443**	**0.0012**	**0.0031**
Methylene chloride	0.005	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.004	<0.001	<0.001	<0.001	<0.001	<0.001
PCE	0.005	**0.0035**	**0.00081J**	**0.0021**	**0.0019**	**0.0072**	**0.0013**	<0.001	<0.001	**0.0097**	<0.001	**0.0096**	<0.001	<0.001	**0.0012**	**0.0018**	<0.001
trans-1,2-DCE	0.1	<0.001	**0.0016**	<0.001	<0.001	**0.0061**	**0.0054**	**0.0055**	**0.0055**	<0.001	**0.0022**	**0.0059**	<0.001	<0.001	**0.0012**	**0.0015**	<0.001
TCE	0.005	**0.0059**	<0.001	**0.00077J**	**0.00068J**	**0.0156**	<0.001	<0.001	<0.001	**0.003**	**0.0011**	**0.0429**	**0.0005J**	<0.001	**0.0232**	**0.0013**	<0.001
VC	0.002[3]	<0.001	**0.0388**	<0.001	<0.001	**0.0477**	**0.0011**	**0.0014**	**0.0015**	**0.0102**	**0.127**	**0.0611**	<0.001	<0.001	**0.0032**	**0.0193**	**0.0016**
Metals																	
Manganese, dissolved	--	<0.0022Ju	**5.4**	**0.0087**	NA	**6.17**	**5.1**	**5.04**	**5.04**	**3.78**	**3.72**	**3.25**	<0.0034Ju	**0.0562**	**1.03**	**6.26**	**0.807**
Wet Chemistry																	
Bromide	--	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Sulfate	--	<4.0	**4.8**	**4.9**	**NA**	**4.1**	**3.1J**	**3.0J**	**2.6J**	**4.3**	**3.2J**	**3.6J**	**9.7**	**4.5**	**4.9**	**5.3**	**3.5J**
VFAs																	
Acetic Acid	--	<2.4Ju	<5	<5uj	NA	<5	<5	<2.1Ju	<2.6Ju	<5uj	<5uj	<5uj	<5	<2.3Ju	<2Ju	<2.4Ju	<2.1Ju
Butyric Acid	--	<5	<5	<5uj	NA	<5	<5	<5	<5	<5uj	<5uj	<5uj	<5	<5	<5	<5	<5
Lactic Acid	--	<25	<25	<25uj	NA	<25	<25	<25	<25	<25uj	<25uj	<25uj	<25	<25	<25	<25	<25
Propionic Acid	--	<5	<5	<5uj	NA	<5	<5	<5	<5	<5uj	<5uj	<5uj	<5	<5	<5	<5	<5
Pyruvic Acid	--	<10	<10	<10uj	NA	<10	<10	<10	<10	<10uj	<10uj	<10uj	<10	<10	<10	<10	<10
Field Parameters																	
Conductance, specific (µmhos/cm @ 25°C)	--	103	417	158	162	331	334	NA	358	415	249	208	472	359	154	359	378
DO (mg/L)	--	8.22	0.0	2.79	4.64	0.0	0.0	NA	0.0	0.16	0.04	0.10	15.08	0.04	0.0	0.0	0.36
FE^{+2}, dissolved (ppm)	--	0	0.4	0	NA	1.0	2	NA	2	3	1.0	0.2	0.0	0	2	9	1
ORP (mV)	--	178	-114	88	133.3	-117	-139	NA	-138	-111	-29	22	80	-148	-41	-100	-145
pH (s.u.)	--	5.30	7.45	6.14	6.19	7.15	7.35	NA	7.27	6.81	6.31	6.23	7.86	7.82	6.50	7.17	7.63
Temperature (°C)	--	18.14	15.56	18.21	13.02	15.68	17.39	NA	17.12	18.90	18.50	18.36	15.88	16.60	17.62	17.42	18.25

(1) Analytical results are reported in milligrams per liter (mg/L) unless otherwise noted.
(2) Amended Record of Decision, USEPA, August 2012
(3) State Primary Drinking Water Regulations: R.61-58 (SC DHEC; August 28, 2009).
(4) DO level anamolously high for groundwater environment.

J Estimated concentration above the adjusted method detection limit and below the adjusted reporting limit.
j- Concentration considered an estimate biased low based on data validation.
u Laboratory reported detection not validated during data validation process.
uj Not detected; quantitation limit may be inaccurate or imprecise.
M0 Matrix spike recovery and/or matrix spike duplicate recovery was outside laboratory control limits.
NA Not analyzed.
Bolding indicates constituent detection in laboratory analyses.
Shading indicates concentration exceeds comparison criteria.

2012 Performance Monitoring Groundwater Results

PARAMETER[1]	GROUNDWATER CLEAN-UP GOAL[2]	SAMPLE LOCATION/DATE															
		A-1 11/29/12	A-2 11/29/12	A-3 12/03/12	A-4 12/03/12	A-5 12/04/12	A-5 (DU-12401) 12/04/12	A-6 12/04/12	A-7 12/03/12	B-1 11/28/12	B-2 11/28/12	B-3 11/28/12	B-4 11/29/12	BW-105 12/10/12	BW-108 12/07/12	BW-201 12/07/12	BW-202 12/10/12
VOCs																	
1,1,1-TCA	0.2	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.002	<0.004	<0.001	<0.001	<0.001	<0.001	<0.001
1,1,2-TCA	0.005	<0.001	**0.00081J**	**0.0024**	<0.001	**0.0019**	**0.0017**	<0.001	<0.001	<0.001	**0.005**	**0.0062**	<0.001	<0.001	<0.001	<0.001	<0.001
1,1-DCA	0.35	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	**0.0018J**	<0.004	<0.001	<0.001	<0.001	<0.001	<0.001
1,1-DCE	0.007	<0.001	<0.001	**0.0029**	<0.001	**0.0037**	**0.0033**	**0.0023**	<0.001	<0.001	**0.0079**	**0.0027J**	<0.001	<0.001	<0.001	<0.001	<0.001
1,2-DCA	0.005	**0.002**	**0.0021**	**0.00053J**	<0.001	**0.0021**	**0.0022**	**0.0015**	**0.00069J**	**0.0028**	**0.0029**	**0.0337**	**0.00053J**	<0.001	<0.001	<0.001	<0.001
2-Butanone	2	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.04	<0.08	<0.02	<0.02	<0.02	<0.02	<0.02
Acetone	0.35	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.04	<0.08	<0.02	<0.02	<0.02	<0.02	<0.02
Benzene	0.005	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.002	<0.004	<0.001	<0.001	<0.001	<0.001	<0.001
Chloroethane	--	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.002	<0.004	<0.001	<0.001	<0.001	<0.001	<0.001
Chloroform	0.1	<0.005	**0.0029J**	**0.004J**	<0.005	**0.0025J**	**0.0026J**	<0.005	<0.005	<0.005	<0.01	<0.02	<0.005	<0.005	<0.005	<0.005	<0.005
Chloromethane	0.063	<0.001	<0.001	<0.001	<0.001	<0.001	**0.00032J**	<0.001	<0.001	<0.001	<0.002	<0.004	<0.001	<0.001	<0.001	<0.001	<0.001
cis-1,2-DCE	0.07	**0.0076**	**0.0058**	**0.0198**	**0.0015**	**0.0424**	**0.039**	**0.032**	**0.0041**	**0.0092**	**0.139**	**0.246**	**0.0018**	<0.001	**0.0039**	**0.001J**	<0.001
Methylene chloride	0.005	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.002	<0.004	<0.001	<0.001	<0.001	<0.001	<0.001
PCE	0.005	**0.00074J**	**0.0072**	**0.0146**	<0.001	**0.0284**	**0.0232**	<0.001	<0.001	<0.001	<0.002	<0.004	<0.001	<0.001	**0.0017**	**0.0032**	**0.004**
trans-1,2-DCE	0.1	<0.001	<0.001	<0.001	**0.0014**	**0.0012**	**0.0012**	<0.001	<0.001	<0.001	**0.005**	**0.0213**	<0.001	<0.001	<0.001	<0.001	<0.001
TCE	0.005	**0.0017**	**0.0136**	**0.0292**	<0.001	**0.0635**	**0.06**	**0.0126**	**0.00073J**	**0.00051J**	**0.0095**	**0.0043**	<0.001	<0.001	**0.0037**	**0.0038**	**0.0025**
VC	0.002[3]	**0.0058**	**0.0069**	<0.001	**0.0023**	**0.0144**	**0.012**	**0.0093**	**0.005**	**0.0218**	**0.0053**	**0.0385**	**0.0069**	<0.001	<0.001	<0.001	<0.001
Metals																	
Manganese, dissolved	--	**4.13**	**4.44**	**0.0702**	**5.08**	**0.801**	**0.788**	**2.82**	**3.46**	**3.27**	**2.42**	**3.63**	**3.57**	**0.0064**	**0.292**	**0.0207**	**0.013**
Wet Chemistry																	
Bromide	--	NA	NA	NA	**1.9**	NA	NA	NA	<0.40	NA	NA	NA	NA	NA	**1.1**	NA	NA
Sulfate	--	**4.0**	**4.0J**	**3.6J**	**2.9J**	**4.3**	**4.3**	**4.7**	**4.1**	**3.6J**	**3.9J**	**3.9J**	**2.6J**	<4.0	**3.9J**	**6.5M0 j-**	**6.3**
VFAs																	
Acetic Acid	--	<5	<5	<5uj	<5uj	<5uj	<5uj	<5uj	<5uj	<5	<5	<5	<5	<2.6Ju	<5	<2Ju	<2.3Ju
Butyric Acid	--	<5	<5	<5uj	<5uj	<5uj	<5uj	<5uj	<5uj	<5	<5	<5	<5	<5	<5	<5	<5
Lactic Acid	--	<25	<25	<25uj	<25uj	<25uj	<25uj	<25uj	<25uj	<25	<25	<25	<25	<25	<25	<25	<25
Propionic Acid	--	<5	<5	<5uj	<5uj	<5uj	<5uj	<5uj	<5uj	<5	<5	<5	<5	<5	<5	<5	<5
Pyruvic Acid	--	<10	<10	<10uj	<10uj	<10uj	<10uj	<10uj	<10uj	<10	<10	<10	<10	<10	<10	<10	<10
Field Parameters																	
Conductance, specific (µmhos/cm @ 25°C)	--	293	225	146	270	162	NA	217	188	180	214	253	229	123	205	181	178
DO (mg/L)	--	0.15	1.03	1.03	0.12	0.41	NA	0.20	0.10	0.23	0.23	0.14	0.12	7.90	0.0	2.17	9.70
FE^{+2}, dissolved (ppm)	--	0.3	0.6	0	2.0	0.1	NA	0.3	2	0.8	0.1	0.1	5	0	0	0	0
ORP (mV)	--	-23	-19	130	-47	70	NA	30	-40	-14	20	-6	-83	136	75	153	-112
pH (s.u.)	--	6.61	6.45	6.12	6.36	5.68	NA	5.94	6.26	6.28	6.58	6.81	6.43	5.73	6.28	6.13	9.48
Temperature (°C)	--	18.60	18.63	16.83	15.86	16.54	NA	17.42	16.33	17.77	17.61	18.17	18.14	18.22	16.44	16.32	16.20

(1) Analytical results are reported in milligrams per liter (mg/L) unless otherwise noted.
(2) Amended Record of Decision, USEPA, August 2012
(3) State Primary Drinking Water Regulations: R.61-58 (SC DHEC; August 28, 2009).
(4) DO level anamolously high for groundwater environment.
J Estimated concentration above the adjusted method detection limit and below the adjusted reporting limit.
j- Concentration considered an estimate biased low based on data validation.
u Laboratory reported detection not validated during data validation process.
uj Not detected; quantitation limit may be inaccurate or imprecise.
M0 Matrix spike recovery and/or matrix spike duplicate recovery was outside laboratory control limits.
NA Not analyzed.
Bolding indicates constituent detection in laboratory analyses.
Shading indicates concentration exceeds comparison criteria.

February 2014 Performance Groundwater Monitoring Results

PARAMETER[1]	GROUNDWATER CLEAN-UP GOAL[2]	MW-4-2 2/18/2014	SW-101 2/19/2014	SW-103 2/19/2014	SW-104 2/19/2014	SW-108 (DU-14102) 2/19/2014	SW-108 2/18/2014	SW-201 2/17/2014	SW-202 2/18/2014	SW-3 2/19/2014	SW-4 2/19/2014
Volatile Organic Compounds											
1,1,1-Trichloroethane	0.2	<0.001	<0.001	NA	NA	<0.001	<0.001	<0.001	<0.001	<0.004	**0.0033**
1,1,2-Trichloroethane	0.005	**0.00082 J**	<0.001	NA	NA	<0.001	<0.001	<0.001	<0.001	<0.004	**0.0014**
1,1-Dichloroethane	0.35	<0.001	<0.001	NA	NA	<0.001	<0.001	<0.001	<0.001	<0.004	**0.00093 J**
1,1-Dichloroethene	0.007	**0.00073 J**	<0.001	NA	NA	<0.001	<0.001	<0.001	<0.001	<0.004	**0.0179**
1,2-Dichloroethane	0.005	**0.0016**	<0.001	NA	NA	<0.001	<0.001	<0.001	<0.001	<0.004	**0.00073 J**
2-Butanone	2	<0.02	<0.02	NA	NA	<0.02	<0.02	<0.02	<0.02	<0.08	<0.02
Acetone	0.35	<0.0343 u	<0.02	NA	NA	<0.02	<0.02	<0.0098 Ju	<0.0029 Ju	<0.08	<0.0071 Ju
Benzene	0.005	<0.001	<0.001	NA	NA	<0.001	<0.001	<0.001	<0.001	<0.004	<0.001
Chloroethane	--	<0.001	<0.001	NA	NA	<0.001	<0.001	<0.001	<0.001	<0.004	<0.001
Chloroform	0.1	<0.005	<0.005	NA	NA	<0.005	**0.00073 J**	**0.00088 J**	<0.005	<0.02	**0.0077**
Chloromethane	0.063	<0.001	<0.001	NA	NA	<0.001	<0.001	<0.001	<0.001	<0.004	<0.001
cis-1,2-Dichloroethene	0.07	**0.016**	**0.00085 J**	NA	NA	**0.0022**	**0.0022**	<0.001	<0.001	**0.006**	<0.001
Methylene chloride	0.005	<0.001	<0.001	NA	NA	<0.001	<0.001	<0.001	<0.001	<0.004	<0.001
Tetrachloroethene	0.005	<0.001	<0.001	NA	NA	**0.0147**	**0.0148**	**0.0021**	**0.0006 J**	**0.361**	**0.0028**
trans-1,2-Dichloroethene	0.1	**0.00051 J**	<0.001	NA	NA	<0.001	<0.001	<0.001	<0.001	<0.004	<0.001
Trichloroethene	0.005	**0.0029**	**0.0019**	NA	NA	**0.0147**	**0.0158**	**0.0027**	<0.001	**0.23**	**0.0277**
Vinyl chloride	0.002[3]	**0.003**	<0.001	NA	NA	<0.001	<0.001	<0.001	<0.001	<0.004	<0.001
Metals and Wet Chemistry											
Manganese, dissolved	--	**2.88**	**0.0268**			**0.004 J**	**0.0048 J**	**0.0042 J**	**0.0282**	**0.0035 J**	**0.0365**
Potassium	--	**2.12**	**4.01**	**4.81**	**2.27**	**1.79**	**1.87**	**1.36**	**2.96**	**5.16**	**7.4**
Bromide	--	**0.98**	<0.40	<0.40	<0.40	<0.40	<0.40	<0.40	<0.40	<0.40	<0.40
Sulfate	--	**4.1**	**5.4**	**2.1 J**	**4.5**	**3.1 J**	**2.8 J**	**3.6 J**	**3.9 J**	**2.2 J**	**2.2 J**
Field Parameters											
Conductance, specific (µmhos/cm @ 25°C)	--	268	172	63	95	NA	86	150	52	64	101
Dissolved Oxygen	--	0.00	10.68 j+	12.03 j+	11.57 j+	NA	1.38	1.84	11.66 j+	17.46 j+	12.63 j+
Ferrous iron, dissolved	--	0.6	0	NA	NA	NA	0	0	0	NA	0
ORP (mV)	--	-86	158	122	103	NA	206	106	203	145	73
pH (s.u.)	--	6.68	6.61	5.78	5.92	NA	4.78	5.92	4.90	5.86	5.65
Temperature (°C)	--	21.20	18.76	17.72	18.71	NA	14.49	17.78	16.00	18.66	17.56
Turbidity (NTU)	--	0.57	137	>1000	121	NA	22.4	43.7	204	238	>1000

(1) Analytical results are reported in milligrams per liter (mg/L) unless otherwise noted.
(2) Amended Record of Decision, USEPA, August 2012
(3) State Primary Drinking Water Regulations: R.61-58 (SC DHEC; August 28, 2009).
J Estimated concentration above the adjusted method detection limit and below the adjusted reporting limit.
Jj- Result biased low - sample collected through peristaltic pump
Ju Unvalidated detection - comparable concentration in trip or rinsate blank
j- Concentration considered an estimate biased low based on data validation.
j+ DO level anomalously high for groundwater environment.
u Laboratory reported detection not validated during data validation process.
uj Not detected; quantitation limit may be inaccurate or imprecise.
NA Not analyzed.
Bolding indicates constituent detection in laboratory analyses.
Shading indicates concentration exceeds comparison criteria.

j- Concentration considered an estimate biased low based on data validation.
j+ DO level anomalously high for groundwater environment.
u Laboratory reported detection not validated during data validation process.
uj Not detected; quantitation limit may be inaccurate or imprecise.
NA Not analyzed.
Bolding indicates constituent detection in laboratory analyses.
Shading indicates concentration exceeds comparison criteria.

February 2014 Performance Groundwater Monitoring Results

PARAMETER[1]	GROUNDWATER CLEAN-UP GOAL[2]	BW-202 2/18/2014	BW-3 2/19/2014	BW-301 2/10/2014	C-1 2/10/2014	C-2 2/10/2014	C-3 2/10/2014	DP-2-1 2/10/2014	DP-3-1 2/7/2014	DP-3-2 2/7/2014	MLW-1-1 2/20/2014	MLW-1-4 2/20/2014	MLW-3-2 2/20/2014	MLW-3-4 2/20/2014	MW-2-1 2/17/2014	MW-2-2 2/17/2014	MW-3D 2/10/2014	MW-4-1 2/18/2014
Volatile Organic Compounds																		
1,1,1-Trichloroethane	0.2	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.004	<0.001	<0.004	<0.001 uj	<0.001 uj	<0.001 uj	<0.001 uj	<0.001	<0.001	<0.002	<0.001
1,1,2-Trichloroethane	0.005	<0.001	<0.001	<0.001	**0.003**	<0.001	<0.001	<0.004	**0.0045**	**0.0068**	<0.001 uj	<0.001 uj	<0.001 uj	<0.001 uj	<0.001	**0.0012**	**0.0035**	<0.001
1,1-Dichloroethane	0.35	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.004	**0.0015**	<0.004	**0.0016 j-**	<0.001 uj	**0.0003 Jj-**	<0.001 uj	<0.001	<0.001	**0.00071 J**	<0.001
1,1-Dichloroethene	0.007	<0.001	<0.001	<0.001	**0.0016**	<0.001	<0.001	<0.004	**0.0031**	**0.0109**	<0.001 uj	**0.00057 Jj-**	<0.001 uj	<0.001 uj	<0.001	<0.001	**0.0014 J**	<0.001
1,2-Dichloroethane	0.005	<0.001	<0.001	<0.001	**0.0022**	**0.00077 J**	**0.0011**	<0.004	**0.0022**	**0.0036 J**	<0.001 uj	<0.001 uj	<0.001 uj	<0.001 uj	**0.00049 J**	<0.001	**0.0024**	**0.0013**
2-Butanone	2	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.08	<0.02	<0.08	**0.0191 Jj-**	<0.02 uj	<0.02 uj	<0.02 uj	<0.02	<0.02	<0.04	<0.02
Acetone	0.35	<0.02	<0.0059 Ju	**0.0155 J**	**0.0054 J**	**0.0074 J**	**0.0029 J**	<0.08	**0.0184 J**	<0.08	<0.0273 u	<0.004 Ju	<0.02 uj	<0.0074 Ju	<0.008 Ju	<0.0112 Ju	**0.0081 J**	<0.0094 Ju
Benzene	0.005	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.004	<0.001	<0.004	<0.001 uj	<0.001 uj	<0.001 uj	<0.001 uj	<0.001	<0.001	<0.002	<0.001
Chloroethane	--	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.004	<0.001	<0.004	<0.001 uj	<0.001 uj	<0.001 uj	<0.001 uj	<0.001	<0.001	<0.002	<0.001
Chloroform	0.1	<0.005	<0.005	<0.005	**0.00076 J**	<0.005	<0.005	<0.02	<0.005	<0.02	**0.0011 Jj-**	<0.005 uj	<0.005 uj	<0.005 uj	<0.005	**0.0011 J**	<0.01	<0.005
Chloromethane	0.063	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.004	<0.001	<0.004	<0.001 uj	<0.001 uj	<0.001 uj	<0.001 uj	<0.001	<0.001	<0.002	<0.001
cis-1,2-Dichloroethene	0.07	<0.001	**0.0054**	**0.00068 J**	**0.154**	**0.003**	**0.0099**	**0.219**	**0.0679**	**0.337**	<0.001 uj	**0.0024 j-**	**0.0079 j-**	**0.0072 j-**	**0.00057 J**	**0.0078**	**0.0956**	**0.0016**
Methylene chloride	0.005	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.004	<0.001	<0.004	**0.0017 j-**	<0.001 uj	<0.001 uj	<0.001 uj	<0.001	<0.001	<0.002	<0.001
Tetrachloroethene	0.005	**0.005**	**0.00058 J**	**0.0016**	**0.0251**	**0.0134**	<0.001	**0.294**	<0.001	**0.021**	<0.001 uj	**0.0011 j-**	**0.00075 Jj-**	<0.001 uj	<0.001	**0.0043**	**0.0046**	<0.001
trans-1,2-Dichloroethene	0.1	<0.001	<0.001	<0.001	**0.0026**	**0.0051**	**0.0071**	**0.0018 J**	**0.0038**	**0.0059**	<0.001 uj	<0.001 uj	<0.001 uj	<0.001 uj	<0.001	**0.0013**	**0.003**	<0.001
Trichloroethene	0.005	**0.0031**	**0.00072 J**	**0.0013**	**0.027**	**0.0021**	<0.001	**0.111**	**0.0015**	**0.0958**	<0.001 uj	**0.0033 j-**	**0.0021 j-**	<0.001 uj	<0.001	**0.0134**	**0.0017 J**	<0.001
Vinyl chloride	0.002[3]	<0.001	<0.001	<0.001	**0.0386**	**0.0326**	**0.0412**	**0.0119**	**0.166**	**0.0287**	<0.001 uj	<0.001 uj	<0.001 uj	<0.001 uj	**0.0011**	**0.00057 J**	**0.276**	**0.0036**
Metals and Wet Chemistry																		
Manganese, dissolved	--	**0.006**	**0.0053**	**4.37**	**4.24**	**4.35**	**4.21**	**3.83**	**3.33**	**2.84**	**0.0413**		**0.0142**		**0.0345**	**1.14**	**5.44**	**0.516**
Potassium	--	**2.21**	**1.58**	**3.15**	**1.93**	**1.96**	**1.97**	**2.87**	**2.46**	**2.36**	**1.39**	**2.34**	**2.33**	**1.72 P4**	**3.5**	**2.03**	**2.65**	**2.35**
Bromide	--	**0.48**	<0.40	**0.91**	**2.4**	**0.79**	**0.95**	**0.67**	**0.33 J**	**0.38 J**	<0.40	**1.3**	<0.40	<0.40	**0.34 J**	**0.48**	**0.66**	**1.0**
Sulfate	--	**4.7**	**6.1**	**7.5**	**4.5**	**4.5**	**4.0**	**8.8**	**3.8 J**	**4.3**	<4.0	**9.8**	**2.7 J**	<4.0	**5.2**	**5.1**	**5.6**	**3.8 J**
Field Parameters																		
Conductance, specific (µmhos/cm @ 25°C)	--	207	293	440	329	353	257	393	274	166	NA	NA	NA	NA	419	136	279	468
Dissolved Oxygen	--	4.01	0.36	0.13	0.58	0.00	5.85	0.25	0.00	0.08	NA	NA	NA	NA	5.62	0.65	0.00	0.00
Ferrous iron, dissolved	--	0	0	0.8	0.8	2.5	2	0	1.5	0.1	NA	NA	0	NA	0.1	NA	0.6	0.4
ORP (mV)	--	129	106	-167	-142	-156	-15	231	-140	143	NA	NA	NA	NA	-200	82	1	-190
pH (s.u.)	--	6.81	6.68	7.32	6.83	6.87	6.12	6.06	6.77	5.75	NA	NA	NA	NA	8.02	5.56	6.25	7.39
Temperature (°C)	--	16.54	14.13	14.75	18.81	16.83	15.20	16.47	18.76	18.19	NA	NA	NA	NA	14.52	15.72	16.00	17.73
Turbidity (NTU)	--	0.93	7.08	4.14	0.01	8.54	1.84	25.2	30.1	4.02	NA	NA	NA	NA	14.2	32.2	0.38	0.67

(1) Analytical results are reported in milligrams per liter (mg/L) unless otherwise noted.

(2) Amended Record of Decision, USEPA, August 2012

(3) State Primary Drinking Water Regulations: R.61-58 (SC DHEC; August 28, 2009).

J Estimated concentration above the adjusted method detection limit and below the adjusted reporting limit.

Jj- Result biased low - sample collected through peristaltic pump

Ju Unvalidated detection - comparable concentration in trip or rinsate blank

j- Concentration considered an estimate biased low based on data validation.

j+ DO level anomalously high for groundwater environment.

u Laboratory reported detection not validated during data validation process.

uj Not detected; quantitation limit may be inaccurate or imprecise.

NA Not analyzed.

Bolding indicates constituent detection in laboratory analyses.

Shading indicates concentration exceeds comparison criteria.

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Shading indicates concentration exceeds comparison criteria.

February 2014 Performance Groundwater Monitoring Results

PARAMETER[1]	GROUNDWATER CLEAN-UP GOAL[2]	A-1 2/10/2014	A-2 2/10/2014	A-3 2/17/2014	A-4 2/18/2014	A-5 (DU-14101) 2/18/2014	A-5 2/17/2014	A-6 2/17/2014	A-7 2/17/2014	B-1 2/7/2014	B-2 2/7/2014	B-3 2/7/2014	B-4 2/7/2014	BW-105 2/19/2014	BW-108 2/18/2014	BW-110 2/18/2014	BW-2 2/19/2014	BW-201 2/17/2014
Volatile Organic Compounds																		
1,1,1-Trichloroethane	0.2	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	**0.00055 J**	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
1,1,2-Trichloroethane	0.005	<0.001	**0.001**	**0.0027**	<0.001	**0.0021**	**0.002**	<0.001	**0.00097 J**	<0.001	**0.0044**	**0.0048**	<0.001	<0.001	<0.001	<0.001	**0.0013**	<0.001
1,1-Dichloroethane	0.35	**0.00031 J**	**0.00038 J**	**0.00076 J**	<0.001	**0.00049 J**	**0.0005 J**	<0.001	<0.001	**0.00056 J**	**0.0014**	**0.0014**	<0.001	<0.001	<0.001	<0.001	**0.00039 J**	<0.001
1,1-Dichloroethene	0.007	<0.001	**0.0011**	**0.0032**	<0.001	**0.0046**	**0.0026**	**0.0012**	**0.0015**	**0.0016**	**0.0114**	**0.0122**	<0.001	<0.001	<0.001	**0.00082 J**	**0.0015**	<0.001
1,2-Dichloroethane	0.005	**0.0014**	**0.0024**	<0.001	**0.00062 J**	<0.001	<0.001	**0.00057 J**	<0.001	**0.00099 J**	**0.0014**	**0.0033**	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
2-Butanone	2	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
Acetone	0.35	**0.0087 J**	**0.0043 J**	<0.02	<0.02	<0.02	<0.02	<0.02	<0.0217 u	**0.0082 J**	**0.0087 J**	**0.0087 J**	**0.0547**	<0.0055 Ju	<0.02	<0.0265 u	<0.0044 Ju	<0.0396 u
Benzene	0.005	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Chloroethane	--	<0.001	<0.001	<0.001	**0.00085 J**	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Chloroform	0.1	<0.005	<0.005	**0.0036 J**	<0.005	**0.0085**	**0.0078**	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	**0.00087 J**	<0.005
Chloromethane	0.063	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
cis-1,2-Dichloroethene	0.07	**0.0085**	**0.0156**	**0.0216**	**0.0014**	**0.034**	**0.0324**	**0.0138**	**0.0357**	**0.0099**	**0.14**	**0.237**	<0.001	<0.001	<0.001	**0.0018**	**0.0089**	**0.00057 J**
Methylene chloride	0.005	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Tetrachloroethene	0.005	<0.001	**0.0019**	**0.0148**	<0.001	**0.0543**	**0.0541**	**0.0036**	<0.001	<0.001	**0.0015**	<0.001	<0.001	<0.001	<0.001	**0.00063 J**	**0.0038**	**0.0017**
trans-1,2-Dichloroethene	0.1	<0.001	**0.00055 J**	**0.0011**	**0.0017**	**0.0015**	**0.0025**	**0.001**	**0.0052**	**0.00083 J**	**0.0024**	**0.0029**	<0.001	<0.001	<0.001	<0.001	**0.00053 J**	<0.001
Trichloroethene	0.005	**0.001**	**0.007**	**0.0277**	<0.001	**0.0886**	**0.0833**	**0.0193**	**0.0099**	**0.0046**	**0.0189**	**0.0077**	<0.001	<0.001	<0.001	**0.0035**	**0.0141**	**0.0026**
Vinyl chloride	0.002[3]	**0.009**	**0.0106**	<0.001	**0.0097**	**0.00045 J**	<0.001	**0.0011**	**0.00091 J**	**0.0076**	**0.0017**	**0.0354**	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Metals and Wet Chemistry																		
Manganese, dissolved	--	**3.11**	**4.28**	**0.218**	**3.88**	**0.261**	**0.26**	**2.24**	**2**	**2.62**	**1.92**	**3.62**	**0.127**	**0.0063**	**0.0927**	**0.0052**	<0.0022 Ju	**0.0215**
Potassium	--	**2.7**	**1.95**	**2.07**	**1.94**	**2**	**2.05**	**2.05**	**2.05**	**1.68**	**2.48**	**2.4**	**4.3**	**1.33**	**3.12**	**2.28**	**2.02**	**2.16**
Bromide	--	**1.3**	**0.71**	**0.51**	**1.1**	**0.32 J**	**0.33 J**	<0.40	**0.50**	**0.33 J**	**0.22 J**	**0.30 J**	<0.40	<0.40	**0.46**	<0.40	**0.73**	<0.40
Sulfate	--	**3.8 J**	**4.2**	**4.2**	**3.8 J**	**3.9 J**	**4.2**	**5.1**	**4.0 J**	**3.7 J**	**4.1**	**4.3**	**3.3 J**	**2.2 J**	**4.7**	**6.4**	**3.1 J**	**6.5**
Field Parameters																		
Conductance, specific (µmhos/cm @ 25°C)	--	414	186	187	322	NA	194	262	173	193	188	211	47	154	209	357	140	159
Dissolved Oxygen	--	0.00	0.00	6.48	0.00	NA	5.83	0.00	0.00	0.00	2.01	0.00	0.00	5.65	0.25	0.85	5.26	0.96
Ferrous iron, dissolved	--	0.9	0.4	0	1.5	NA	0	0.1	0.25	0.6	0	0	0.6	0	0	0	0	0.1
ORP (mV)	--	-166	72	224	-121	NA	93	-29	47	-84	231	120	-91	87	129	-11	76	135
pH (s.u.)	--	6.98	5.99	5.82	6.59	NA	6.30	6.54	5.84	6.47	5.92	6.09	6.46	6.16	5.67	7.29	6.06	5.50
Temperature (°C)	--	15.49	16.49	13.84	15.31	NA	13.99	17.22	15.08	18.47	18.66	18.82	19.32	20.46	11.51	17.16	20.54	15.70
Turbidity (NTU)	--	4.40	1.04	6.26	0.0	NA	1.31	51.4	5.70	1.21	7.10	11.1	20.1	17.0	59.3	0.0	1.93	7.51

(1) Analytical results are reported in milligrams per liter (mg/L) unless otherwise noted.

(2) Amended Record of Decision, USEPA, August 2012

(3) State Primary Drinking Water Regulations: R.61-58 (SC DHEC; August 28, 2009).

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Ju Unvalidated detection - comparable concentration in trip or rinsate blank

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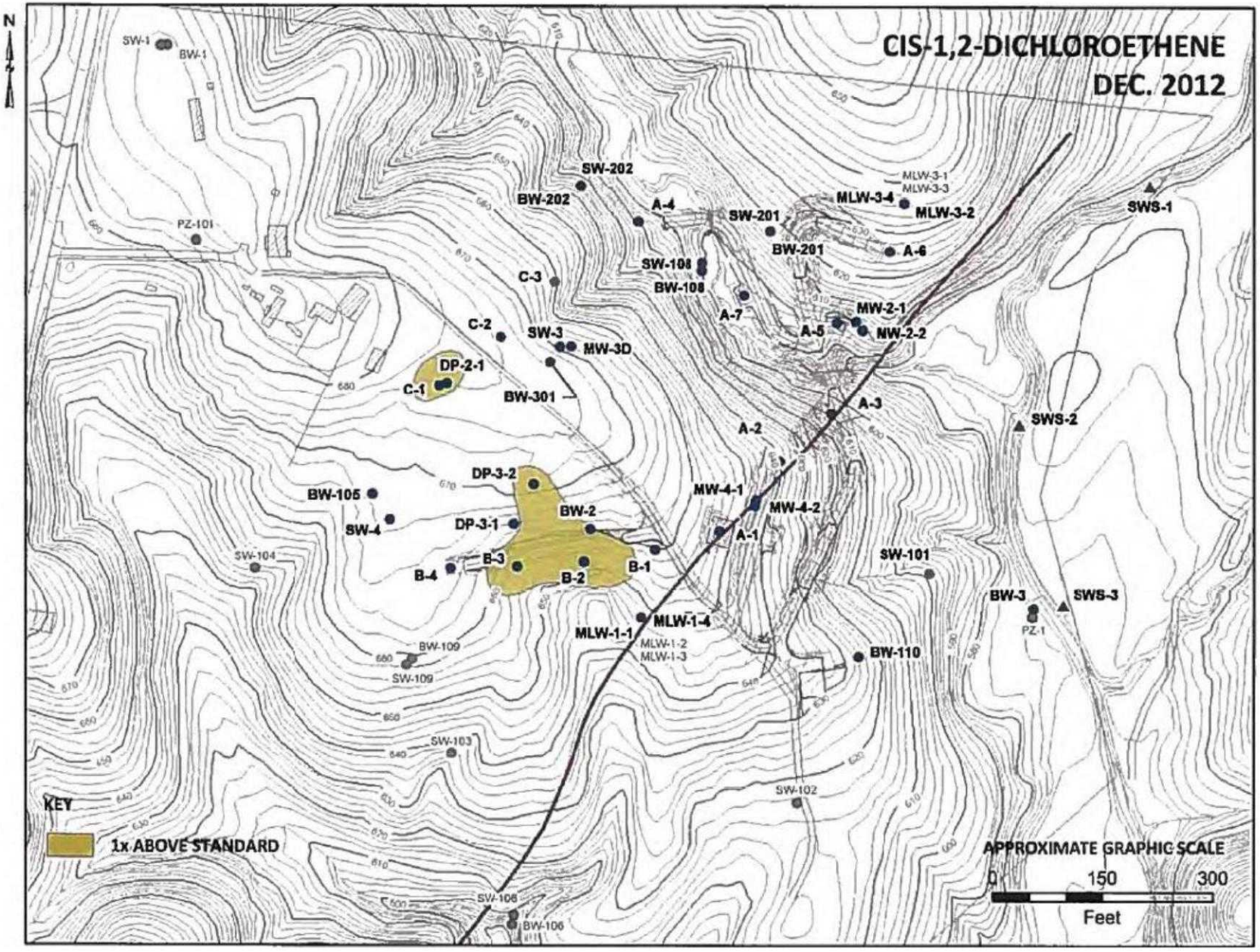
CIS-1,2-DICHLOROETHENE
DEC. 2012
N
SW-1
BW-1
PZ-101
SW-202
BW-202
A-4
SW-201
BW-201
MLW-3-1
MLW-3-3
MLW-3-4
MLW-3-2
A-6
SWS-1
SW-108
BW-108
C-3
A-7
C-2
SW-3
MW-3D
A-5
MW-2-1
NW-2-2
DP-2-1
C-1
BW-301
A-3
SWS-2
A-2
DP-3-2
BW-105
MW-4-1
MW-4-2
BW-2
SW-4
DP-3-1
A-1
SW-104
B-3
B-4
B-2
B-1
SW-101
BW-3
SWS-3
PZ-1
MLW-1-4
MLW-1-1
MLW-1-2
MLW-1-3
BW-109
SW-109
BW-110
SW-103
SW-102
KEY
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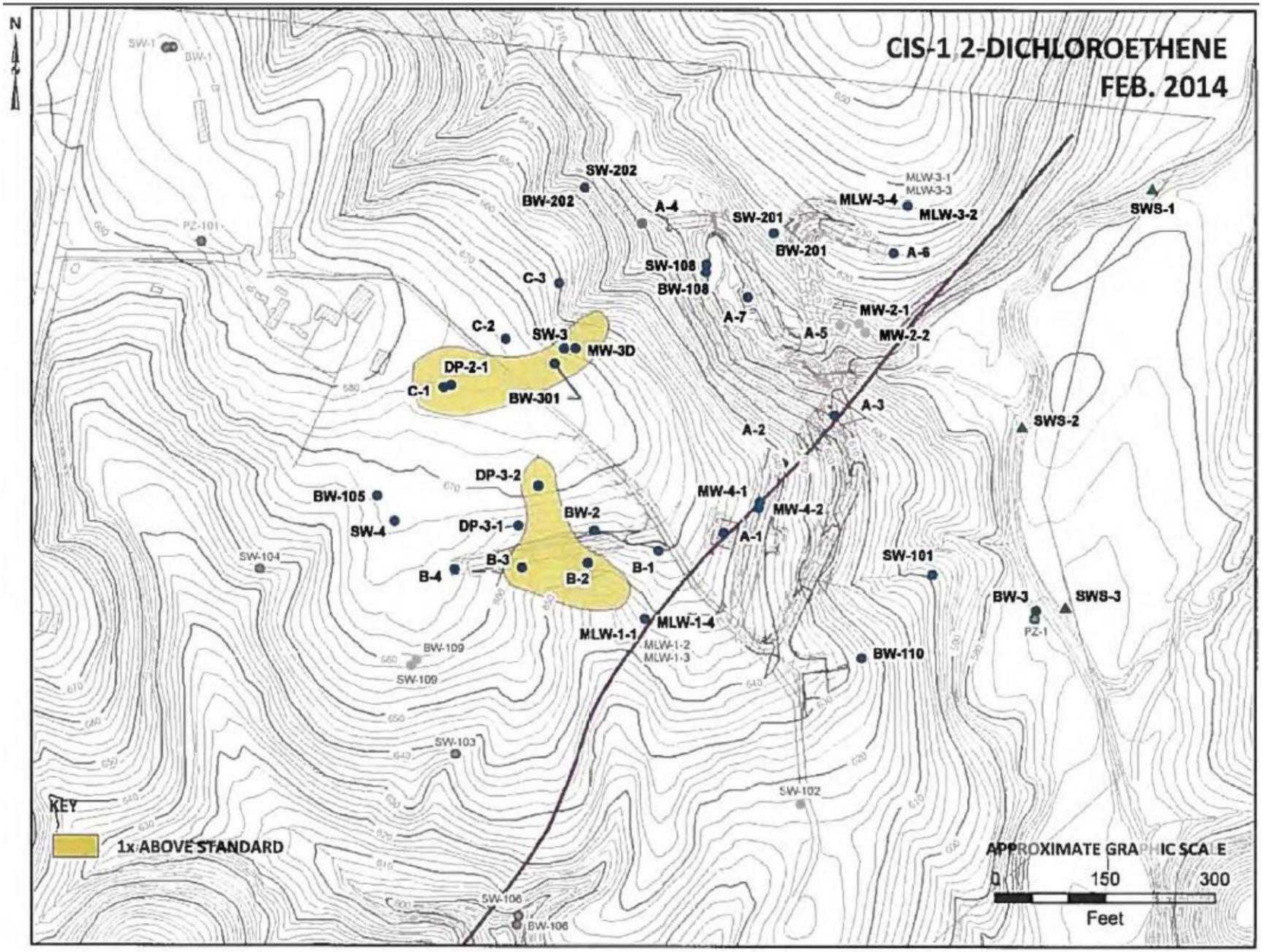
SW-106
BW-106
APPROXIMATE GRAPHIC SCALE
0
150
300
Feet


CIS-1 2-DICHLOROETHENE
FEB. 2014
N
SW-1
BW-1
PZ-101
SW-202
BW-202
A-4
SW-201
BW-201
MLW-3-1
MLW-3-3
MLW-3-4
MLW-3-2
A-6
SWS-1
SW-108
BW-108
C-3
A-7
MW-2-1
A-5
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C-2
SW-3
MW-3D
DP-2-1
C-1
BW-301
A-3
SWS-2
A-2
DP-3-2
BW-105
MW-4-1
MW-4-2
SW-4
DP-3-1
BW-2
A-1
SW-104
B-3
B-4
B-2
B-1
SW-101
BW-3
SWS-3
PZ-1
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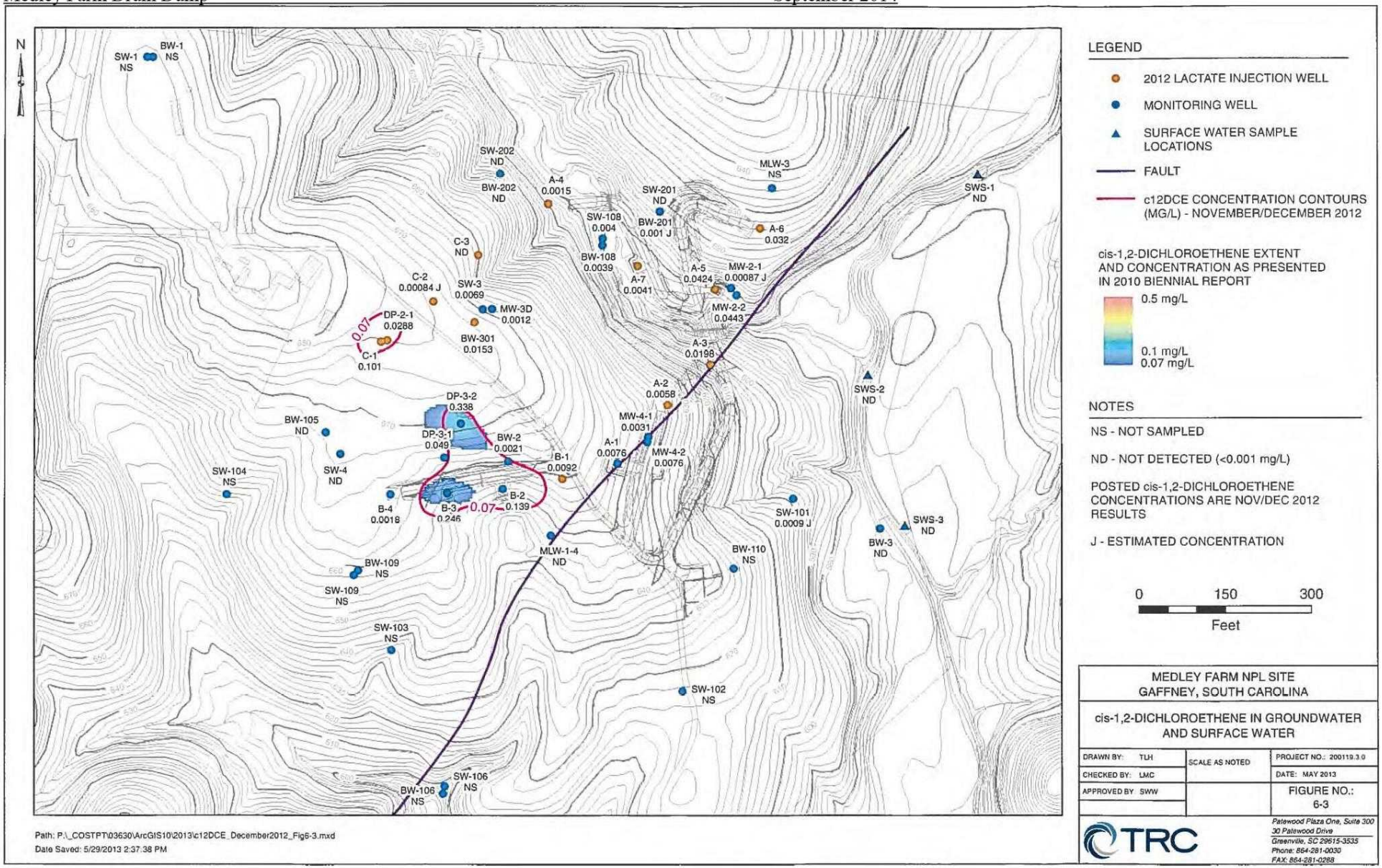
MLW-1-1
MLW-1-2
MLW-1-3
BW-110
BW-109
SW-109
SW-103
SW-102
SW-106
BW-106
KEY
1x ABOVE STANDARD
APPROXIMATE GRAPHIC SCALE
0
150
300
Feet


N
BW-1 NS
SW-1 NS
SW-202 ND
BW-202 ND
A-4 0.0015
SW-201 ND
BW-201 0.001 J
SW-108 0.004
BW-108 0.0039
A-7 0.0041
MLW-3 NS
SWS-1 ND
A-6 0.032
A-5 0.0424
MW-2-1 0.00087 J
MW-2-2 0.0443
C-3 ND
C-2 0.00084 J
SW-3 0.0069
MW-3D 0.0012
BW-301 0.0153
DP-2-1 0.0288
C-1 0.101
0.07
A-3 0.0198
A-2 0.0058
SWS-2 ND
DP-3-2 0.338
DP-3-1 0.049
BW-2 0.0021
B-1 0.0092
MW-4-1 0.0031
MW-4-2 0.0076
A-1 0.0076
BW-105 ND
SW-4 ND
SW-104 NS
B-4 0.0018
B-3 0.246
B-2 0.139
SW-101 0.0009 J
SWS-3 ND
BW-3 ND
MLW-1-4 ND
BW-110 NS
BW-109 NS
SW-109 NS
SW-103 NS
SW-102 NS
SW-106 NS
BW-106 NS
LEGEND
2012 LACTATE INJECTION WELL
MONITORING WELL
SURFACE WATER SAMPLE LOCATIONS
FAULT
c12DCE CONCENTRATION CONTOURS (MG/L) - NOVEMBER/DECEMBER 2012
cis-1,2-DICHLOROETHENE EXTENT AND CONCENTRATION AS PRESENTED IN 2010 BIENNIAL REPORT
0.5 mg/L
0.1 mg/L
0.07 mg/L
NOTES
NS - NOT SAMPLED
ND - NOT DETECTED (<0.001 mg/L)
POSTED cis-1,2-DICHLOROETHENE CONCENTRATIONS ARE NOV/DEC 2012 RESULTS
J - ESTIMATED CONCENTRATION
0
150
300
Feet
MEDLEY FARM NPL SITE
GAFFNEY, SOUTH CAROLINA
cis-1,2-DICHLOROETHENE IN GROUNDWATER AND SURFACE WATER
DRAWN BY: TLH
CHECKED BY: LMC
APPROVED BY: SWW
SCALE AS NOTED
PROJECT NO.: 200119.3.0
DATE: MAY 2013
FIGURE NO.: 6-3
TRC
Patewood Plaza One, Suite 300
30 Patewood Drive
Greenville, SC 29615-3535
Phone: 864-281-0030
FAX: 864-281-0288
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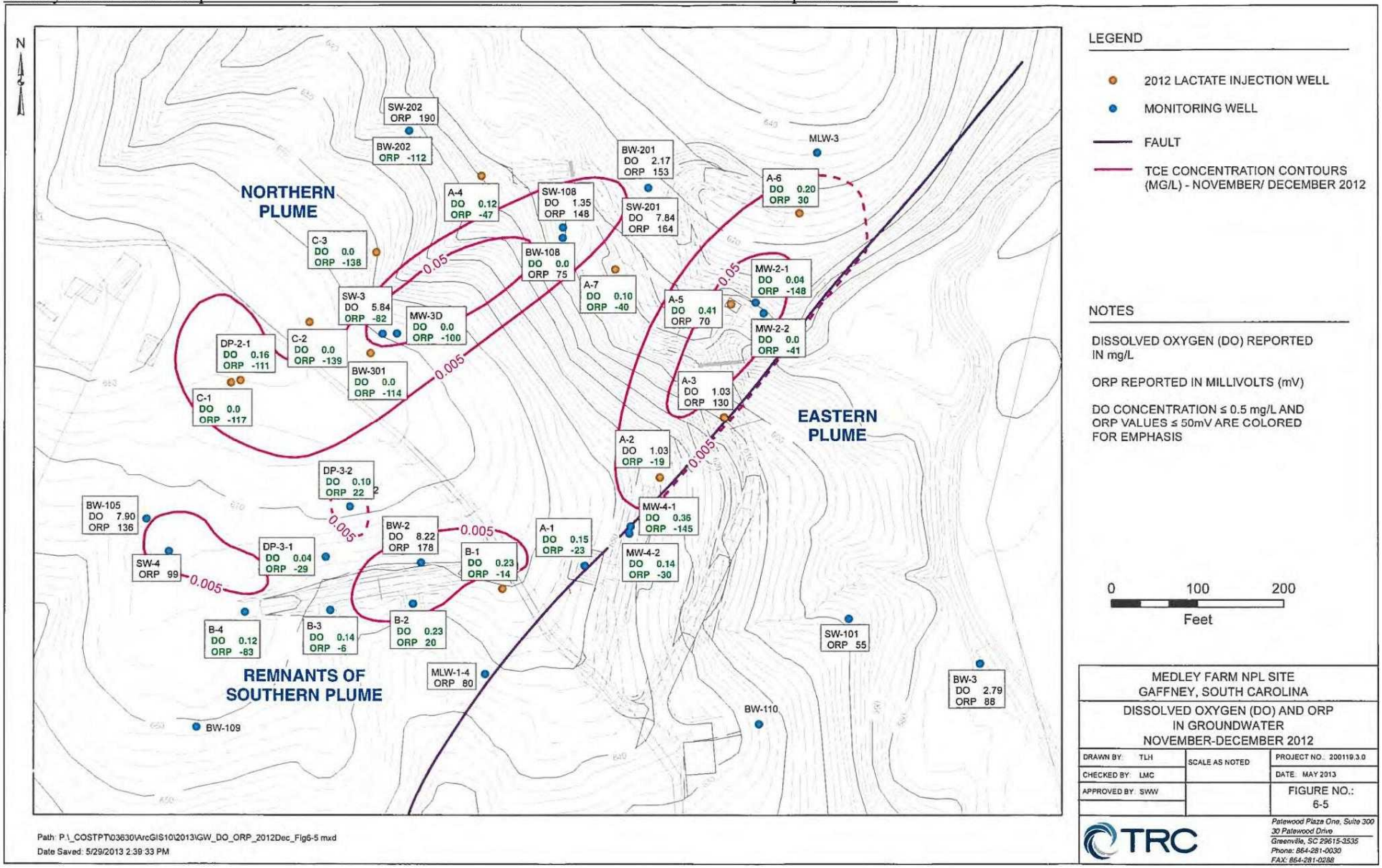
N
NORTHERN PLUME
EASTERN PLUME
REMNANTS OF SOUTHERN PLUME
SW-202 ORP 190
BW-202 ORP -112
A-4 DO 0.12 ORP -47
SW-108 DO 1.35 ORP 148
BW-201 DO 2.17 ORP 153
SW-201 DO 7.84 ORP 164
MLW-3
A-6 DO 0.20 ORP 30
C-3 DO 0.0 ORP -138
BW-108 DO 0.0 ORP 75
A-7 DO 0.10 ORP -40
A-5 DO 0.41 ORP 70
MW-2-1 DO 0.04 ORP -148
MW-2-2 DO 0.0 ORP -41
SW-3 DO 5.84 ORP -82
MW-3D DO 0.0 ORP -100
DP-2-1 DO 0.16 ORP -111
C-2 DO 0.0 ORP -139
BW-301 DO 0.0 ORP -114
C-1 DO 0.0 ORP -117
A-3 DO 1.03 ORP 130
A-2 DO 1.03 ORP -19
DP-3-2 DO 0.10 ORP 22
BW-105 DO 7.90 ORP 136
BW-2 DO 8.22 ORP 178
A-1 DO 0.15 ORP -23
MW-4-1 DO 0.35 ORP -145
DP-3-1 DO 0.04 ORP -29
B-1 DO 0.23 ORP -14
MW-4-2 DO 0.14 ORP -30
SW-4 ORP 99
B-4 DO 0.12 ORP -83
B-3 DO 0.14 ORP -5
B-2 DO 0.23 ORP 20
SW-101 ORP 55
BW-3 DO 2.79 ORP 88
MLW-1-4 ORP 80
BW-110
BW-109
0.05
0.005
LEGEND
2012 LACTATE INJECTION WELL
MONITORING WELL
FAULT
TCE CONCENTRATION CONTOURS (MG/L) - NOVEMBER/ DECEMBER 2012
NOTES
DISSOLVED OXYGEN (DO) REPORTED IN mg/L
ORP REPORTED IN MILLIVOLTS (mV)
DO CONCENTRATION ≤ 0.5 mg/L AND ORP VALUES ≤ 50mV ARE COLORED FOR EMPHASIS
0
100
200
Feet
MEDLEY FARM NPL SITE
GAFFNEY, SOUTH CAROLINA
DISSOLVED OXYGEN (DO) AND ORP IN GROUNDWATER
NOVEMBER-DECEMBER 2012
DRAWN BY: TLH
SCALE AS NOTED
PROJECT NO.: 200119.3.0
CHECKED BY: LMC
DATE: MAY 2013
APPROVED BY: SWW
FIGURE NO.: 6-5
TRC
Patewood Plaza One, Suite 300
30 Patewood Drive
Greenville, SC 29615-3535
Phone: 864-281-0030
FAX: 864-281-0288
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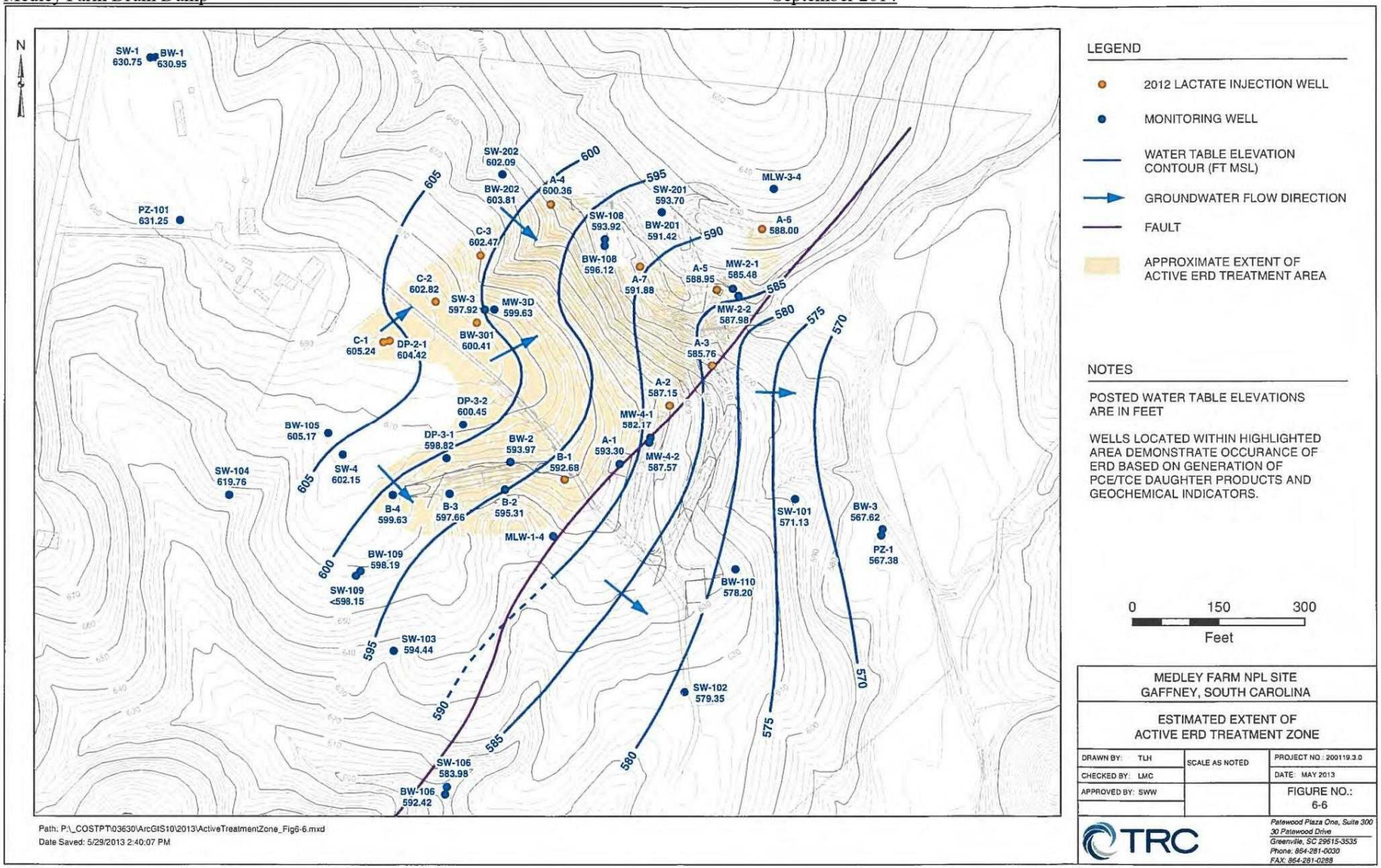
N
SW-1 630.75
BW-1 630.95
PZ-101 631.25
SW-202 602.09
BW-202 603.81
A-4 600.36
SW-201 593.70
MLW-3-4
SW-108 593.92
BW-201 591.42
A-6 588.00
C-3 602.47
BW-108 596.12
A-7 591.88
A-5 588.95
MW-2-1 585.48
C-2 602.82
SW-3 597.92
MW-3D 599.63
MW-2-2 587.98
BW-301 600.41
C-1 605.24
DP-2-1 604.42
A-3 585.76
A-2 587.15
DP-3-2 600.45
MW-4-1 582.17
BW-105 605.17
DP-3-1 598.82
BW-2 593.97
A-1 593.30
MW-4-2 587.57
B-1 592.68
SW-104 619.76
SW-4 602.15
B-4 599.63
B-3 597.66
B-2 595.31
SW-101 571.13
BW-3 567.62
MLW-1-4
PZ-1 567.38
BW-109 598.19
SW-109 <598.15
BW-110 578.20
SW-103 594.44
SW-102 579.35
SW-106 583.98
BW-106 592.42
605
600
595
590
585
580
575
570
LEGEND
2012 LACTATE INJECTION WELL
MONITORING WELL
WATER TABLE ELEVATION CONTOUR (FT MSL)
GROUNDWATER FLOW DIRECTION
FAULT
APPROXIMATE EXTENT OF ACTIVE ERD TREATMENT AREA
NOTES
POSTED WATER TABLE ELEVATIONS ARE IN FEET
WELLS LOCATED WITHIN HIGHLIGHTED AREA DEMONSTRATE OCCURANCE OF ERD BASED ON GENERATION OF PCE/TCE DAUGHTER PRODUCTS AND GEOCHEMICAL INDICATORS.
0
150
300
Feet
MEDLEY FARM NPL SITE
GAFFNEY, SOUTH CAROLINA
ESTIMATED EXTENT OF ACTIVE ERD TREATMENT ZONE
DRAWN BY: TLH
CHECKED BY: LMC
APPROVED BY: SWW
SCALE AS NOTED
PROJECT NO.: 200119.3.0
DATE: MAY 2013
FIGURE NO.: 6-6
TRC
Patewood Plaza One, Suite 300
30 Patewood Drive
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FAX: 864-281-0288
Path: P:_COSTPT\03630\ArcGIS10\2013\ActiveTreatmentZone_Fig6-6.mxd
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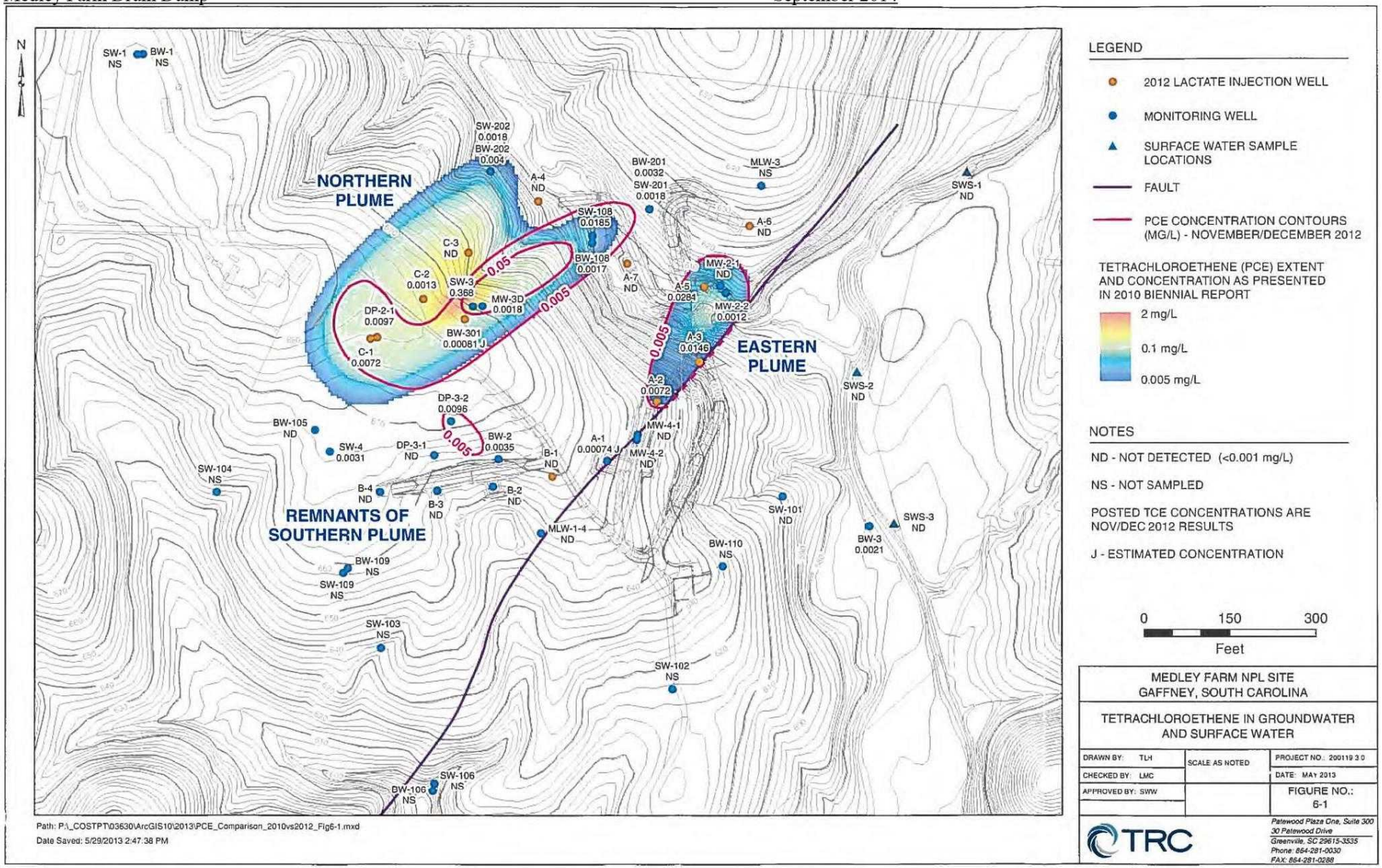
N
SW-1 NS
BW-1 NS
SW-202 0.0018
BW-202 0.004
NORTHERN PLUME
A-4 ND
BW-201 0.0032
SW-201 0.0018
MLW-3 NS
SWS-1 ND
SW-108 0.0185
A-6 ND
C-3 ND
BW-108 0.0017
A-7 ND
MW-2-1 ND
C-2 0.0013
SW-3 0.368
0.05
A-5 0.0284
MW-3D 0.0018
0.005
MW-2-2 0.0012
DP-2-1 0.0097
BW-301 0.00081 J
A-3 0.0146
EASTERN PLUME
C-1 0.0072
0.005
A-2 0.0072
SWS-2 ND
DP-3-2 0.0096
BW-105 ND
MW-4-1 ND
SW-4 0.0031
DP-3-1 ND
BW-2 0.0035
0.005
B-1 ND
A-1 0.00074 J
MW-4-2 ND
SW-104 NS
B-4 ND
B-3 ND
B-2 ND
SW-101 ND
SWS-3 ND
REMNANTS OF SOUTHERN PLUME
MLW-1-4 ND
BW-3 0.0021
BW-110 NS
BW-109 NS
SW-109 NS
SW-103 NS
SW-102 NS
SW-106 NS
BW-106 NS
LEGEND
2012 LACTATE INJECTION WELL
MONITORING WELL
SURFACE WATER SAMPLE LOCATIONS
FAULT
PCE CONCENTRATION CONTOURS (MG/L) - NOVEMBER/DECEMBER 2012
TETRACHLOROETHENE (PCE) EXTENT AND CONCENTRATION AS PRESENTED IN 2010 BIENNIAL REPORT
2 mg/L
0.1 mg/L
0.005 mg/L
NOTES
ND - NOT DETECTED (<0.001 mg/L)
NS - NOT SAMPLED
POSTED TCE CONCENTRATIONS ARE NOV/DEC 2012 RESULTS
J - ESTIMATED CONCENTRATION
0
150
300
Feet
MEDLEY FARM NPL SITE
GAFFNEY, SOUTH CAROLINA
TETRACHLOROETHENE IN GROUNDWATER AND SURFACE WATER
DRAWN BY: TLH
SCALE AS NOTED
PROJECT NO.: 200119.3.0
CHECKED BY: LMC
DATE: MAY 2013
APPROVED BY: SWW
FIGURE NO.: 6-1
TRC
Patewood Plaza One, Suite 300
30 Patewood Drive
Greenville, SC 29615-3535
Phone: 864-281-0030
FAX: 864-281-0288
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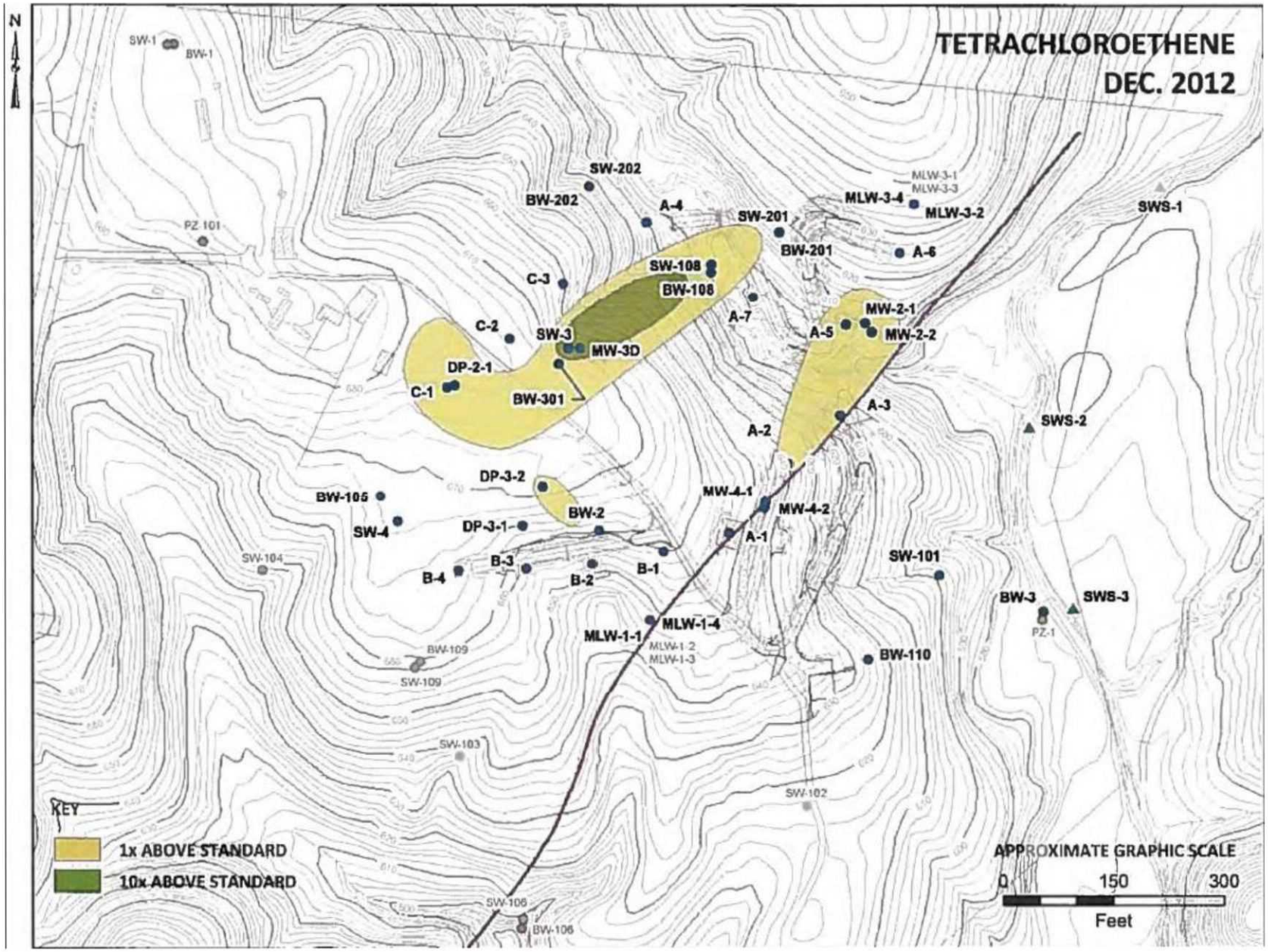
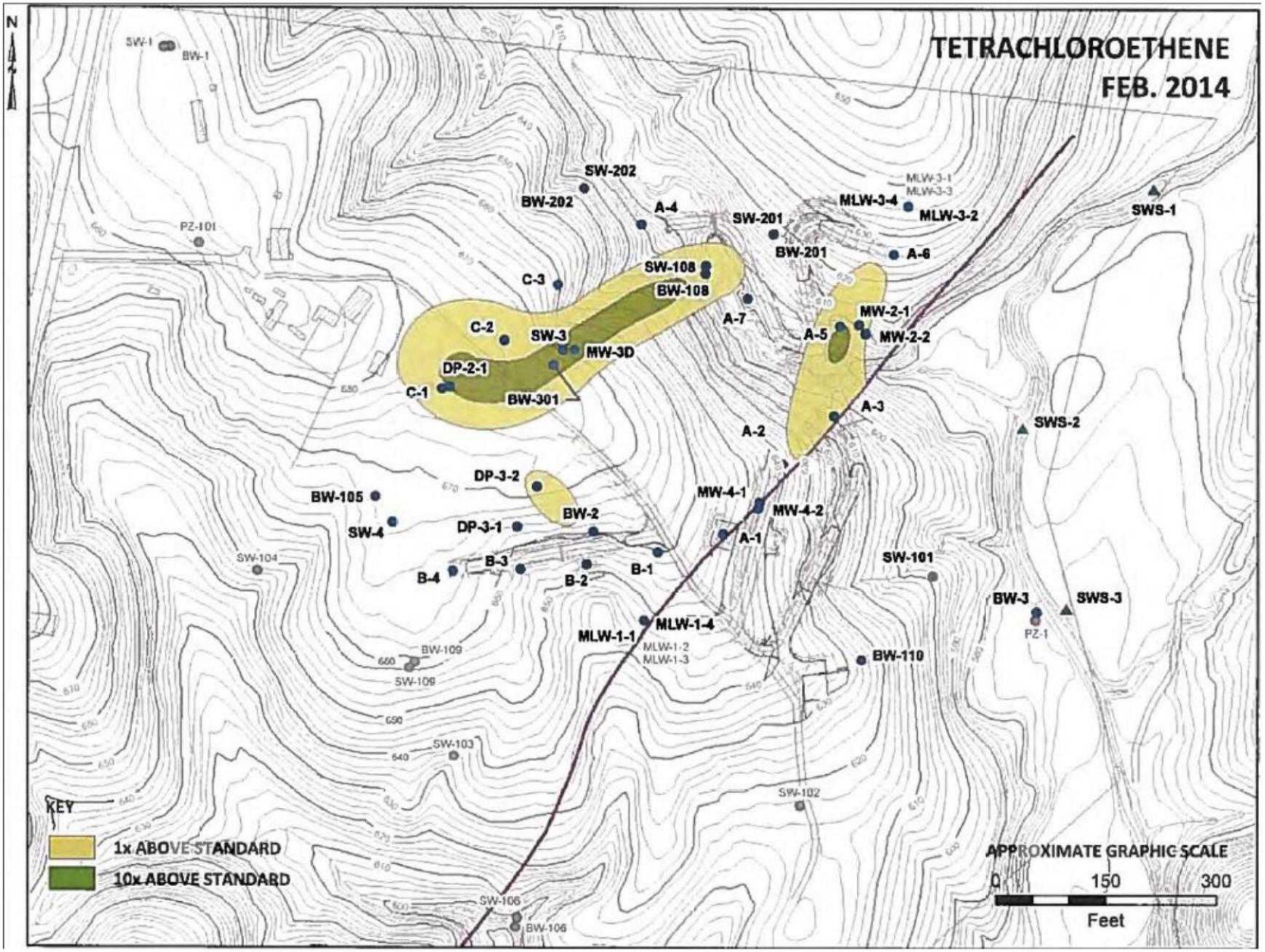
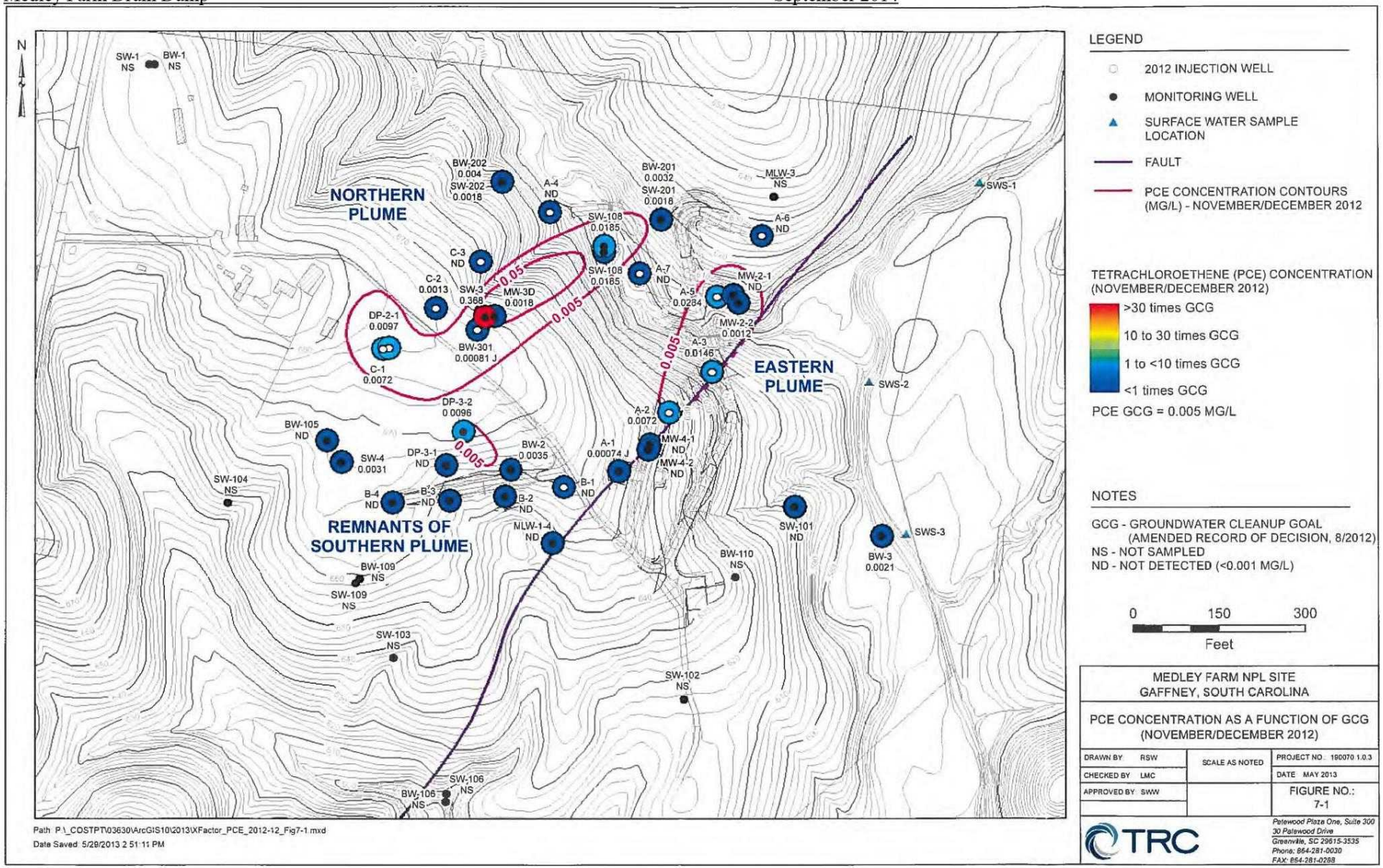

TETRACHLOROETHENE
DEC. 2012
N
SW-1
BW-1
PZ-101
SW-202
BW-202
A-4
SW-201
BW-201
MLW-3-1
MLW-3-3
MLW-3-4
MLW-3-2
A-6
SWS-1
SW-108
BW-108
C-3
A-7
MW-2-1
MW-2-2
A-5
C-2
SW-3
MW-3D
DP-2-1
C-1
BW-301
A-3
A-2
SWS-2
DP-3-2
BW-105
MW-4-1
MW-4-2
BW-2
SW-4
DP-3-1
A-1
SW-104
B-3
B-4
B-2
B-1
SW-101
BW-3
SWS-3
PZ-1
MLW-1-4
MLW-1-1
MLW-1-2
MLW-1-3
BW-109
SW-109
BW-110
SW-103
SW-102
KEY
1x ABOVE STANDARD
10x ABOVE STANDARD
SW-106
BW-106
APPROXIMATE GRAPHIC SCALE
0
150
300
Feet


TETRACHLOROETHENE
FEB. 2014
N
SW-1
BW-1
PZ-101
SW-202
BW-202
A-4
SW-201
BW-201
MLW-3-1
MLW-3-3
MLW-3-4
MLW-3-2
A-6
SWS-1
SW-108
BW-108
C-3
A-7
C-2
SW-3
MW-3D
DP-2-1
C-1
BW-301
MW-2-1
MW-2-2
A-5
A-3
A-2
SWS-2
DP-3-2
BW-105
SW-4
DP-3-1
BW-2
MW-4-1
MW-4-2
A-1
SW-104
B-4
B-3
B-2
B-1
SW-101
BW-3
SWS-3
PZ-1
MLW-1-1
MLW-1-4
MLW-1-2
MLW-1-3
BW-109
SW-109
BW-110
SW-103
SW-102
SW-106
BW-106
KEY
1x ABOVE STANDARD
10x ABOVE STANDARD
APPROXIMATE GRAPHIC SCALE
0
150
300
Feet



LEGEND

- 2012 INJECTION WELL
- MONITORING WELL
- SURFACE WATER SAMPLE LOCATION
- FAULT
- PCE CONCENTRATION CONTOURS (MG/L) - NOVEMBER/DECEMBER 2012

TETRACHLOROETHENE (PCE) CONCENTRATION (NOVEMBER/DECEMBER 2012)

- >30 times GCG
- 10 to 30 times GCG
- 1 to <10 times GCG
- <1 times GCG

PCE GCG = 0.005 MG/L

NOTES

GCG - GROUNDWATER CLEANUP GOAL (AMENDED RECORD OF DECISION, 8/2012)
NS - NOT SAMPLED
ND - NOT DETECTED (<0.001 MG/L)

0 150 300
Feet

MEDLEY FARM NPL SITE
GAFFNEY, SOUTH CAROLINA

PCE CONCENTRATION AS A FUNCTION OF GCG (NOVEMBER/DECEMBER 2012)

DRAWN BY: RSW	SCALE AS NOTED	PROJECT NO.: 190070 1.0.3
CHECKED BY: LMC		DATE: MAY 2013
APPROVED BY: SWW		FIGURE NO.: 7-1

TRC
Patewood Plaza One, Suite 300
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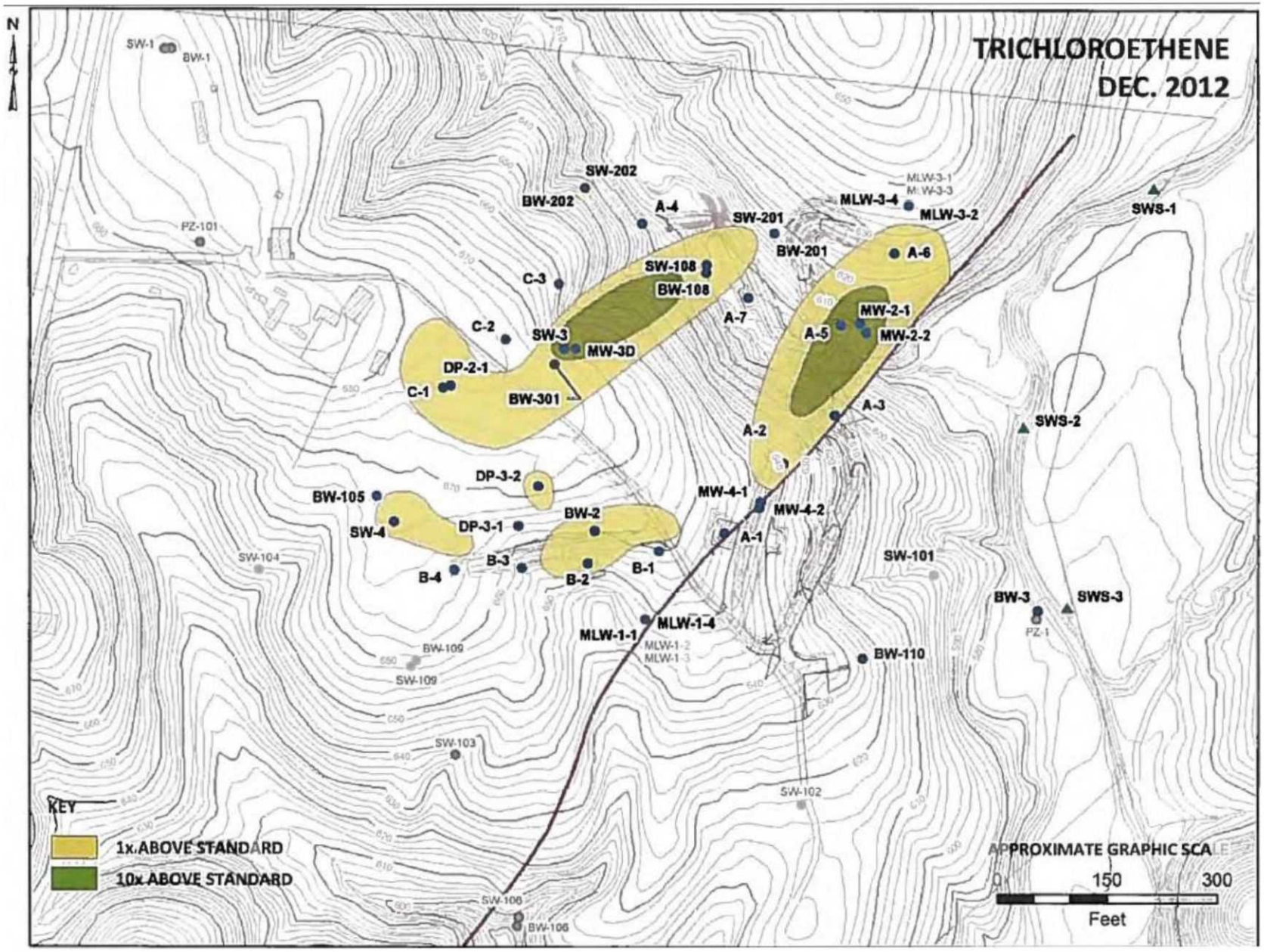
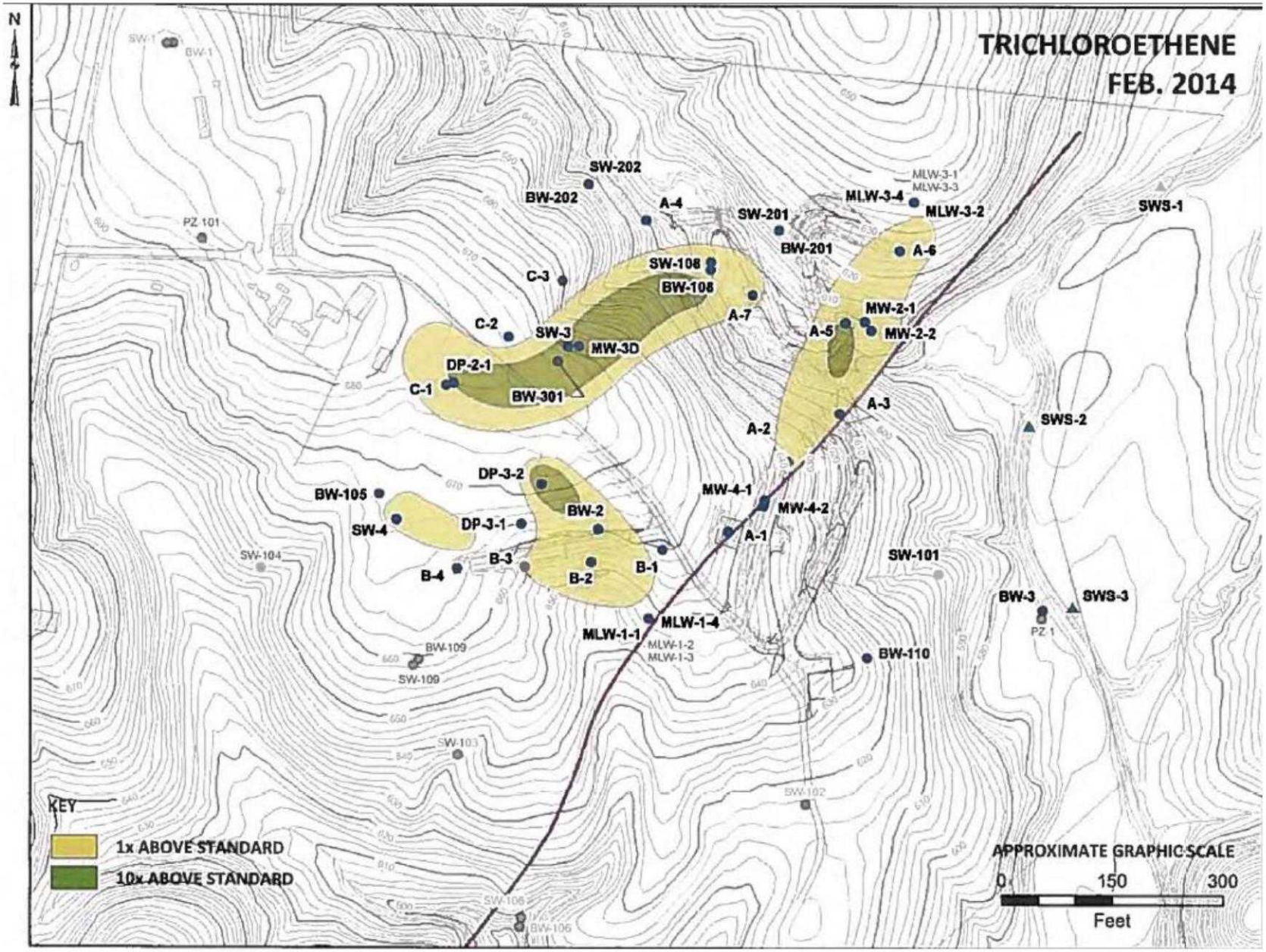
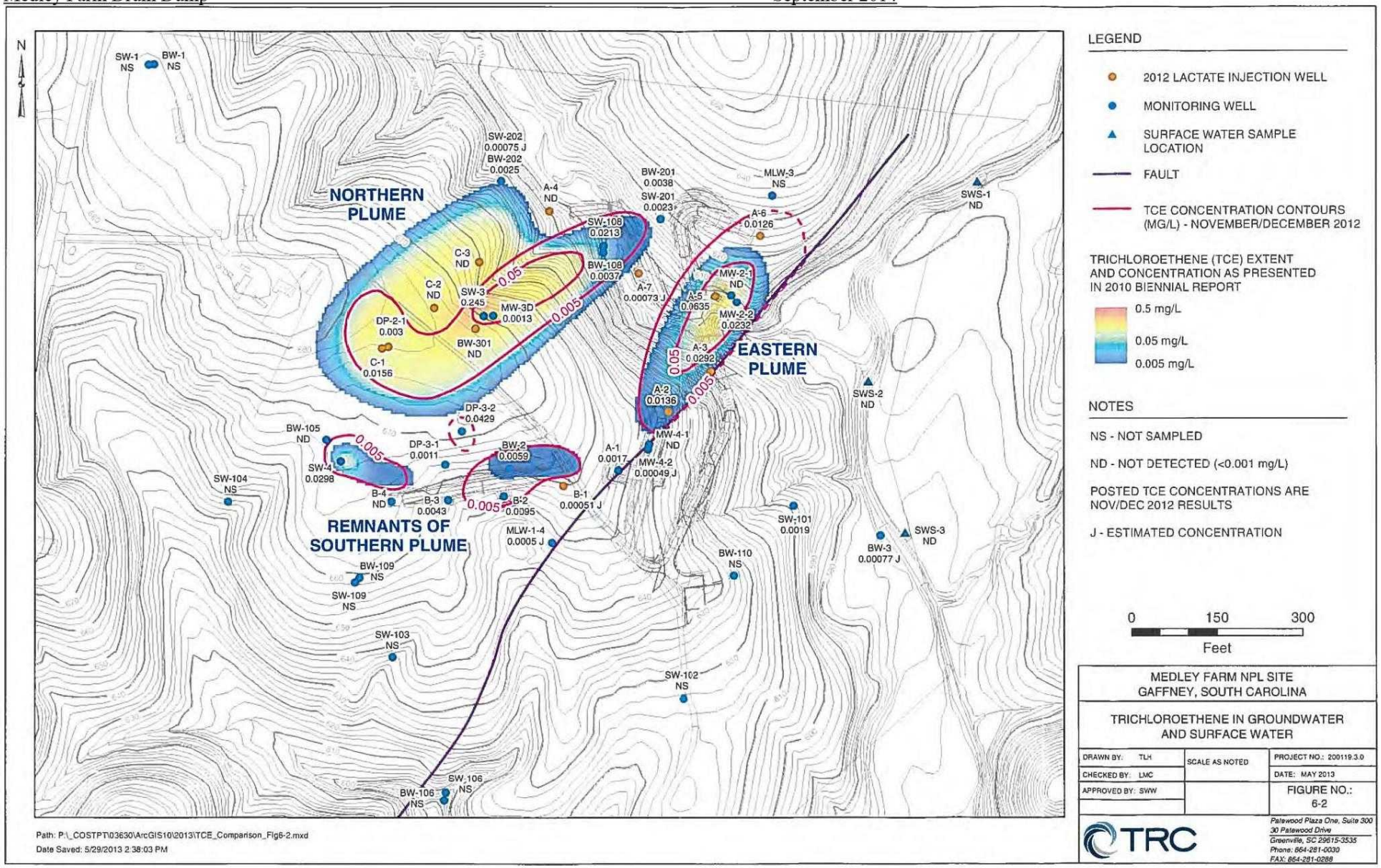
FAX: 864-281-0288


TRICHLOROETHENE
DEC. 2012
N
SW-1
BW-1
PZ-101
SW-202
BW-202
A-4
SW-201
BW-201
MLW-3-4
MLW-3-2
MLW-3-1
MLW-3-3
SWS-1
A-6
SW-108
BW-108
C-3
A-7
MW-2-1
MW-2-2
A-5
C-2
SW-3
MW-3D
DP-2-1
C-1
BW-301
A-3
A-2
SWS-2
DP-3-2
BW-105
MW-4-1
MW-4-2
BW-2
SW-4
DP-3-1
A-1
SW-104
B-3
B-1
B-4
B-2
SW-101
BW-3
SWS-3
PZ-1
MLW-1-1
MLW-1-4
MLW-1-2
MLW-1-3
BW-109
SW-109
BW-110
SW-103
SW-102
KEY
1x ABOVE STANDARD
10x ABOVE STANDARD
SW-106
BW-106
APPROXIMATE GRAPHIC SCALE
0
150
300
Feet


TRICHLOROETHENE
FEB. 2014
N
SW-202
BW-202
A-4
SW-201
BW-201
MLW-3-4
MLW-3-1
MLW-3-3
MLW-3-2
SWS-1
A-6
PZ 101
SW-108
BW-108
C-3
A-7
C-2
SW-3
MW-3D
DP-2-1
C-1
BW-301
MW-2-1
MW-2-2
A-5
A-3
A-2
SWS-2
DP-3-2
BW-105
BW-2
MW-4-1
MW-4-2
SW-4
DP-3-1
A-1
SW-104
B-3
B-4
B-2
B-1
SW-101
BW-3
SWS-3
PZ 1
MLW-1-4
MLW-1-1
MLW-1-2
MLW-1-3
BW-109
SW-109
BW-110
SW-103
SW-102
SW-106
BW-106
KEY
1x ABOVE STANDARD
10x ABOVE STANDARD
APPROXIMATE GRAPHIC SCALE
0
150
300
Feet


N
SW-1 NS
BW-1 NS
SW-202 0.00075 J
BW-202 0.0025
NORTHERN PLUME
A-4 ND
BW-201 0.0038
SW-201 0.0023
MLW-3 NS
SWS-1 ND
SW-106 0.0213
A-6 0.0126
C-3 ND
BW-108 0.0037
C-2 ND
SW-3 0.245
0.05
MW-2-1 ND
A-7 0.00073 J
A-5 0.0635
MW-3D 0.0013
0.005
MW-2-2 0.0232
DP-2-1 0.003
BW-301 ND
C-1 0.0156
A-3 0.0292
EASTERN PLUME
0.05
0.005
SWS-2 ND
A-2 0.0136
DP-3-2 0.0429
BW-105 ND
0.005
DP-3-1 0.0011
BW-2 0.0059
MW-4-1 ND
A-1 0.0017
SW-4 0.0298
MW-4-2 0.00049 J
SW-104 NS
B-4 ND
B-3 0.0043
0.005
B-2 0.0095
B-1 0.00051 J
SW-101 0.0019
SWS-3 ND
REMNANTS OF SOUTHERN PLUME
MLW-1-4 0.0005 J
BW-3 0.00077 J
BW-109 NS
BW-110 NS
SW-109 NS
SW-103 NS
SW-102 NS
SW-106 NS
BW-106 NS
LEGEND
2012 LACTATE INJECTION WELL
MONITORING WELL
SURFACE WATER SAMPLE LOCATION
FAULT
TCE CONCENTRATION CONTOURS (MG/L) - NOVEMBER/DECEMBER 2012
TRICHLOROETHENE (TCE) EXTENT AND CONCENTRATION AS PRESENTED IN 2010 BIENNIAL REPORT
0.5 mg/L
0.05 mg/L
0.005 mg/L
NOTES
NS - NOT SAMPLED
ND - NOT DETECTED (<0.001 mg/L)
POSTED TCE CONCENTRATIONS ARE NOV/DEC 2012 RESULTS
J - ESTIMATED CONCENTRATION
0
150
300
Feet
MEDLEY FARM NPL SITE
GAFFNEY, SOUTH CAROLINA
TRICHLOROETHENE IN GROUNDWATER AND SURFACE WATER
DRAWN BY: TLH
SCALE AS NOTED
PROJECT NO.: 200119.3.0
CHECKED BY: LMC
DATE: MAY 2013
APPROVED BY: SWW
FIGURE NO.: 6-2
TRC
Patewood Plaza One, Suite 300
30 Patewood Drive
Greenville, SC 29615-3535
Phone: 864-281-0030
FAX: 864-281-0288
Path: P:_COSTPT\03630\ArcGIS10\2013\TCE_Comparison_Fig6-2.mxd
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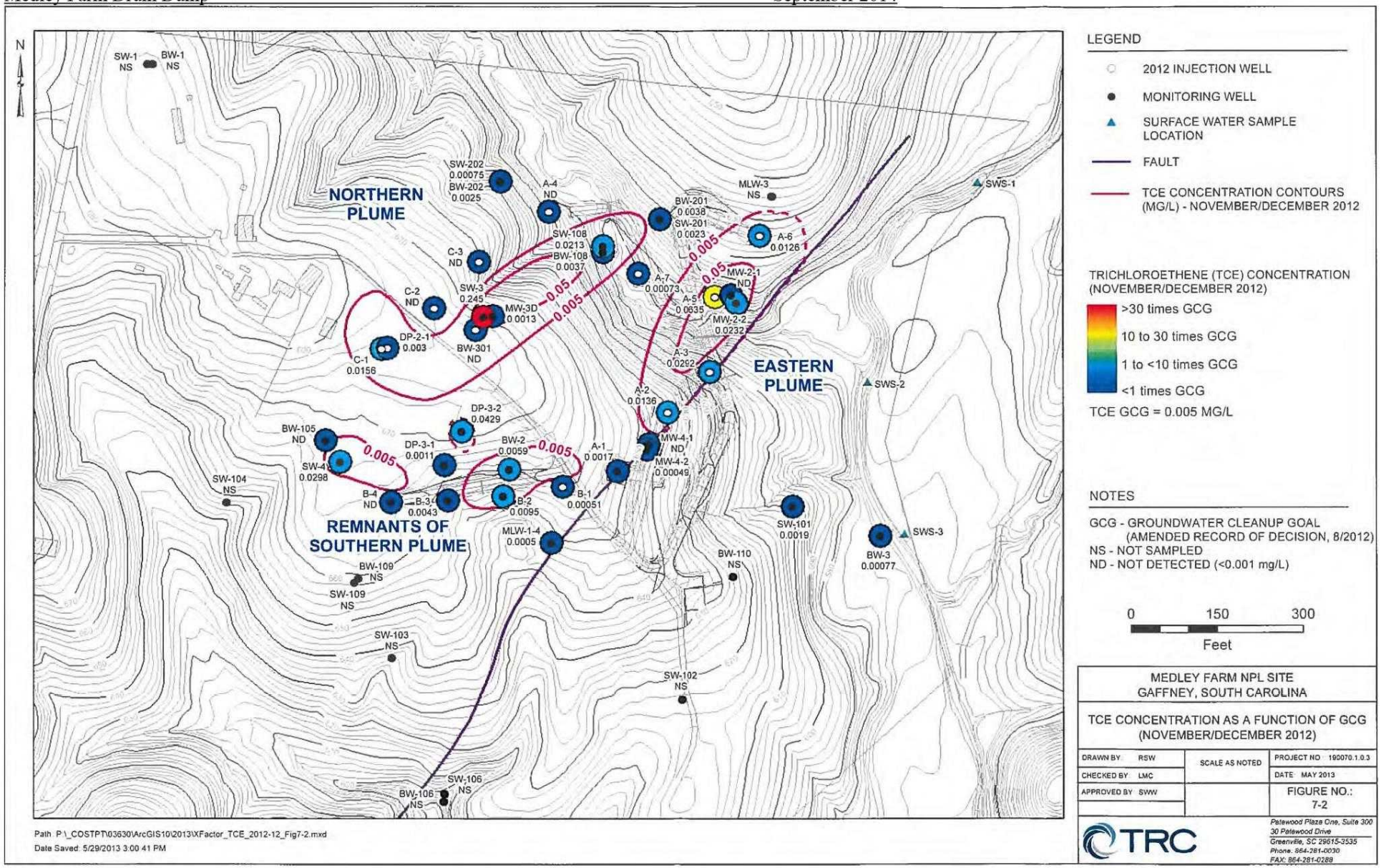
N
SW-1 NS
BW-1 NS
NORTHERN PLUME
SW-202 0.00075
BW-202 0.0025
A-4 ND
SW-108 0.0213
BW-108 0.0037
C-3 ND
C-2 ND
SW-3 0.245
MW-3D 0.0013
BW-301 ND
DP-2-1 0.003
C-1 0.0156
0.05
0.005
BW-201 0.0038
SW-201 0.0023
MLW-3 NS
A-6 0.0126
A-7 0.00073
A-5 0.0635
MW-2-1 ND
MW-2-2 0.0232
A-3 0.0292
EASTERN PLUME
SWS-1
SWS-2
SWS-3
A-2 0.0136
DP-3-2 0.0429
BW-105 ND
DP-3-1 0.0011
BW-2 0.0059
SW-4 0.0298
MW-4-1 ND
MW-4-2 0.00049
A-1 0.0017
B-1 0.00051
SW-104 NS
B-4 ND
B-3 0.0043
B-2 0.0095
REMNANTS OF SOUTHERN PLUME
MLW-1-4 0.0005
SW-101 0.0019
BW-3 0.00077
BW-110 NS
BW-109 NS
SW-109 NS
SW-103 NS
SW-102 NS
SW-106 NS
BW-106 NS
LEGEND
2012 INJECTION WELL
MONITORING WELL
SURFACE WATER SAMPLE LOCATION
FAULT
TCE CONCENTRATION CONTOURS (MG/L) - NOVEMBER/DECEMBER 2012
TRICHLOROETHENE (TCE) CONCENTRATION (NOVEMBER/DECEMBER 2012)
>30 times GCG
10 to 30 times GCG
1 to <10 times GCG
<1 times GCG
TCE GCG = 0.005 MG/L
NOTES
GCG - GROUNDWATER CLEANUP GOAL (AMENDED RECORD OF DECISION, 8/2012)
NS - NOT SAMPLED
ND - NOT DETECTED (<0.001 mg/L)
0
150
300
Feet
MEDLEY FARM NPL SITE
GAFFNEY, SOUTH CAROLINA
TCE CONCENTRATION AS A FUNCTION OF GCG (NOVEMBER/DECEMBER 2012)
DRAWN BY RSW
CHECKED BY LMC
APPROVED BY SWW
SCALE AS NOTED
PROJECT NO 190070.1.0.3
DATE MAY 2013
FIGURE NO.: 7-2
TRC
Patewood Plaza One, Suite 300
30 Patewood Drive
Greenville, SC 29615-3535
Phone: 864-281-0030
FAX: 864-281-0288
Path: P:_COSTPT\03630\ArcGIS10\2013\XFactor_TCE_2012-12_Fig7-2.mxd
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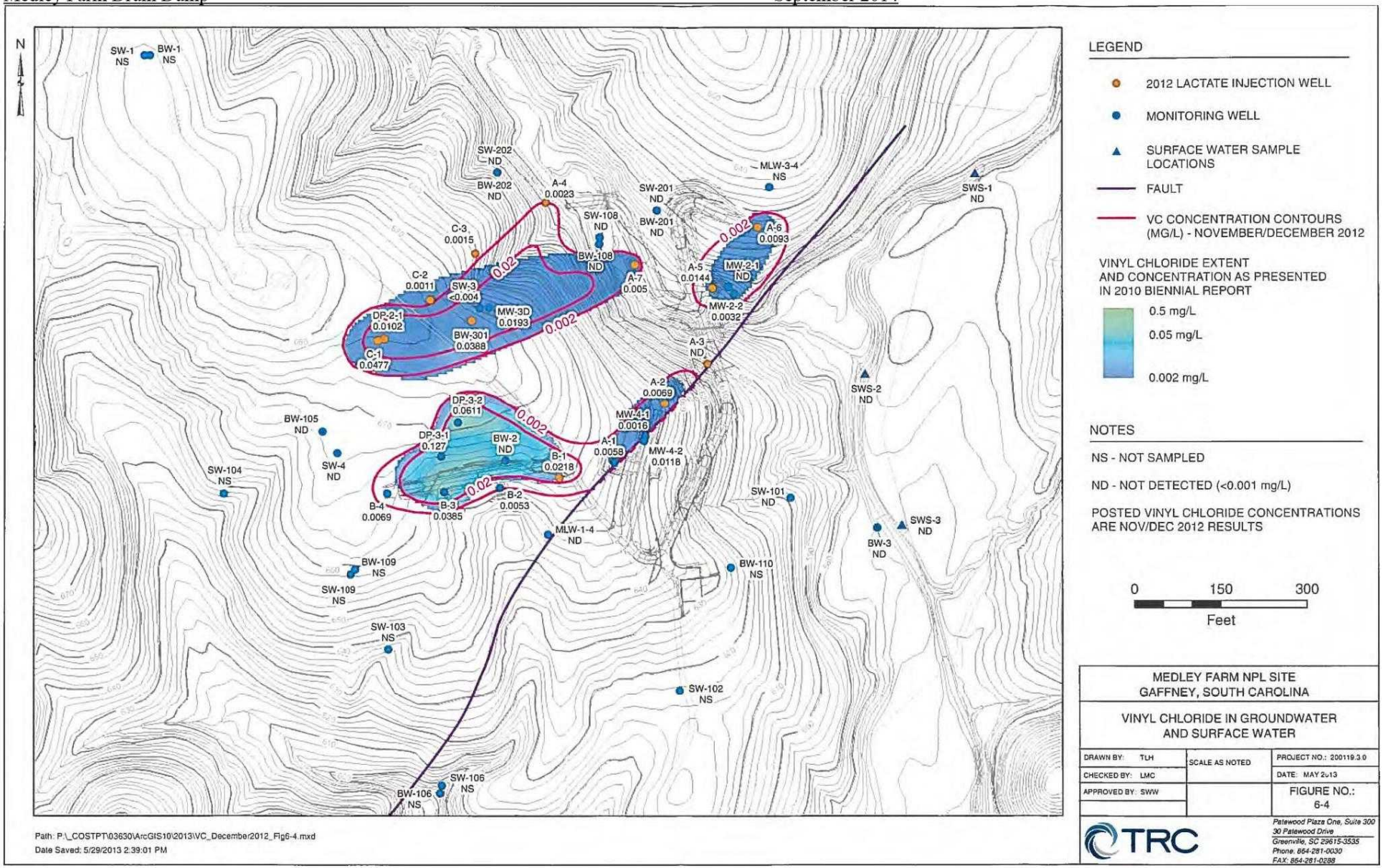

MEDLEY FARM NPL SITE
GAFFNEY, SOUTH CAROLINA

VINYL CHLORIDE IN GROUNDWATER AND SURFACE WATER

DRAWN BY: TLH	SCALE AS NOTED	PROJECT NO.: 200119.3.0
CHECKED BY: LMC		DATE: MAY 2013
APPROVED BY: SWW		FIGURE NO.: 6-4

TRC
Patewood Plaza One, Suite 300
30 Patewood Drive
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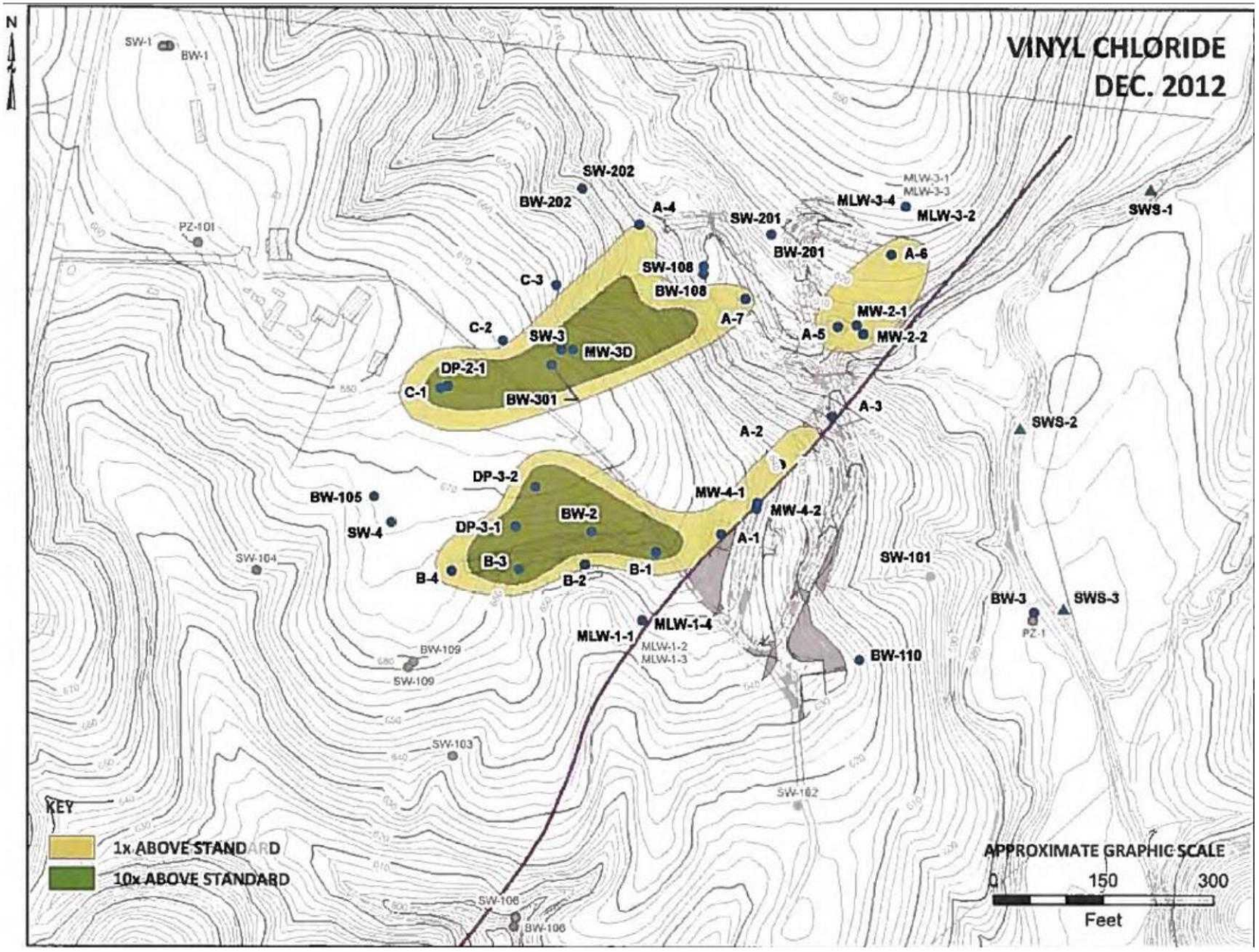
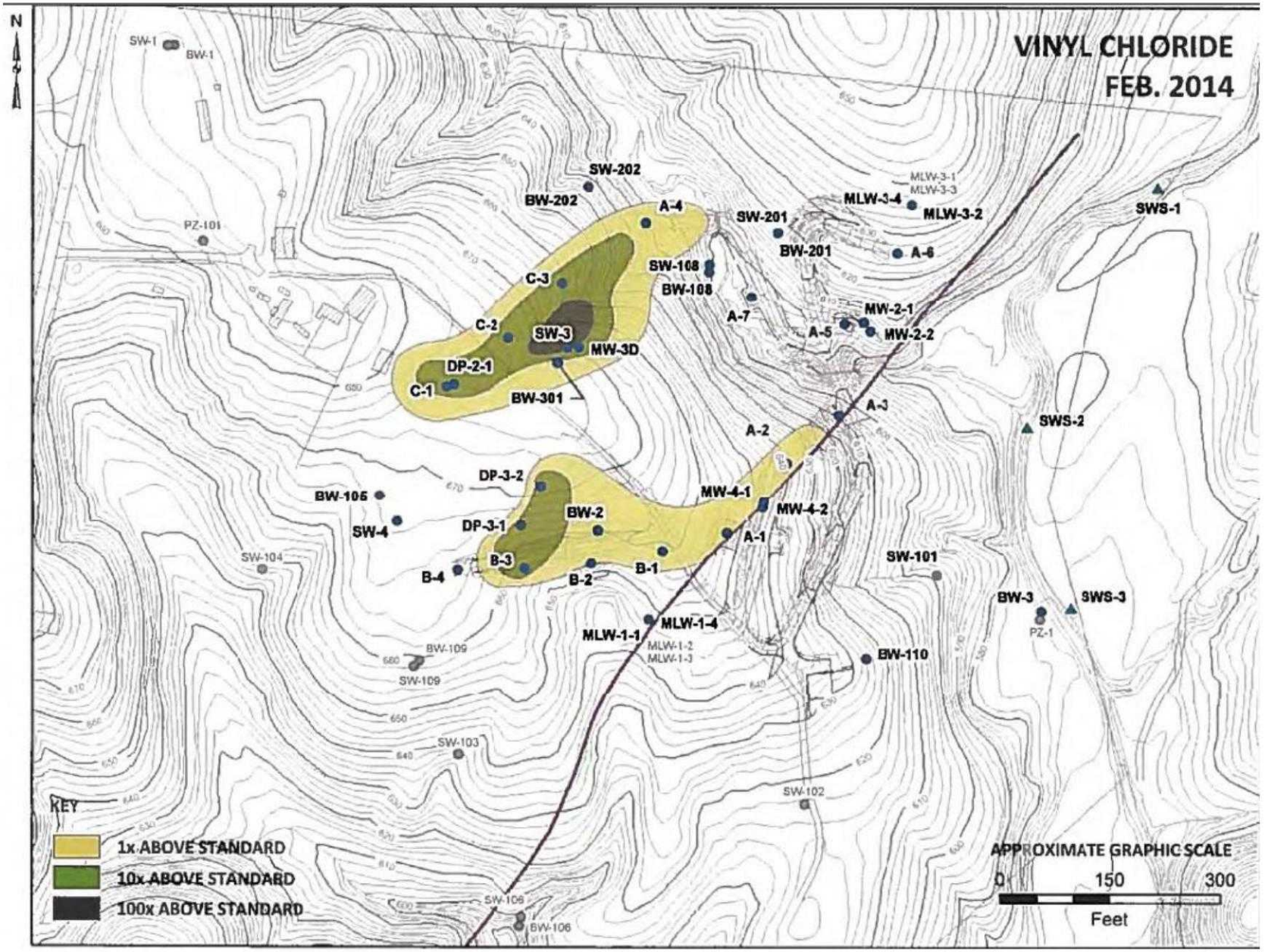
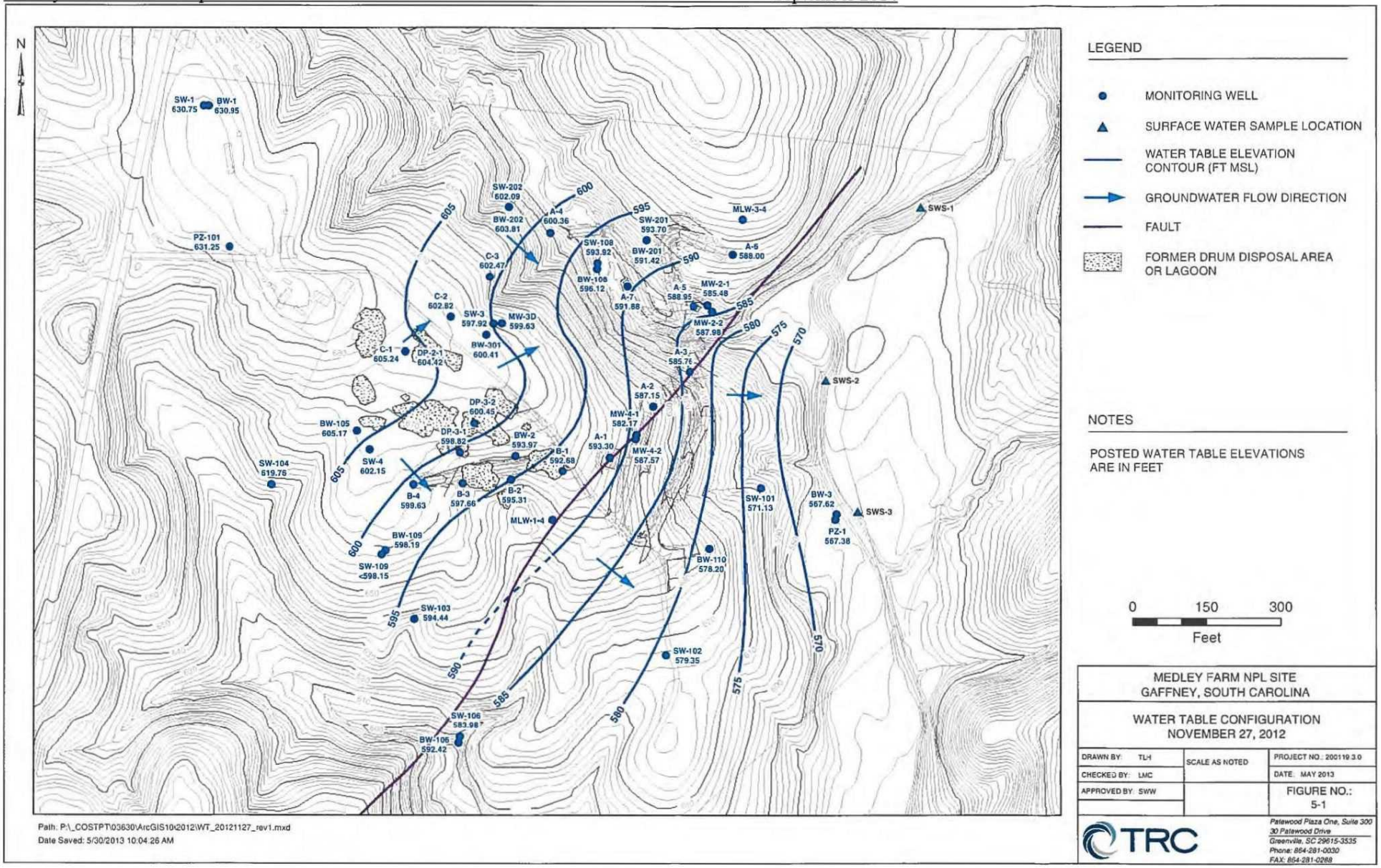
FAX: 864-281-0288


VINYL CHLORIDE
DEC. 2012
N
SW-1
BW-1
PZ-101
SW-202
BW-202
A-4
SW-201
BW-201
MLW-3-4
MLW-3-1
MLW-3-3
MLW-3-2
SWS-1
A-6
SW-108
BW-108
C-3
A-7
C-2
SW-3
MW-3D
DP-2-1
C-1
BW-301
MW-2-1
MW-2-2
A-5
A-3
SWS-2
A-2
DP-3-2
BW-105
SW-4
DP-3-1
BW-2
MW-4-1
MW-4-2
A-1
SW-101
SW-104
B-3
B-4
B-2
B-1
BW-3
SWS-3
PZ-1
MLW-1-4
MLW-1-1
MLW-1-2
MLW-1-3
BW-109
SW-109
BW-110
SW-103
SW-102
KEY
1x ABOVE STANDARD
10x ABOVE STANDARD
APPROXIMATE GRAPHIC SCALE
0
150
300
Feet
SW-106
BW-106


VINYL CHLORIDE
FEB. 2014
N
SW-1
BW-1
PZ-101
SW-202
BW-202
A-4
SW-201
BW-201
MLW-3-1
MLW-3-3
MLW-3-4
MLW-3-2
A-6
SWS-1
SW-108
BW-108
C-3
C-2
SW-3
MW-3D
DP-2-1
C-1
BW-301
A-7
A-5
MW-2-1
MW-2-2
A-3
A-2
SWS-2
DP-3-2
BW-105
SW-4
DP-3-1
BW-2
MW-4-1
MW-4-2
A-1
B-3
B-4
B-2
B-1
SW-104
SW-101
BW-3
SWS-3
PZ-1
MLW-1-1
MLW-1-4
MLW-1-2
MLW-1-3
BW-109
SW-109
BW-110
SW-103
SW-102
SW-106
BW-106
KEY
1x ABOVE STANDARD
10x ABOVE STANDARD
100x ABOVE STANDARD
APPROXIMATE GRAPHIC SCALE
0
150
300
Feet


N
SW-1 630.75
BW-1 630.95
PZ-101 631.25
SW-202 602.09
BW-202 603.81
A-4 600.36
SW-201 593.70
MLW-3-4
SWS-1
SW-108 593.92
BW-201 591.42
A-5 588.00
BW-108 596.12
A-7 591.88
A-5 588.95
MW-2-1 585.48
MW-2-2 587.98
C-3 602.47
C-2 602.82
SW-3 597.92
MW-3D 599.63
BW-301 600.41
C-1 605.24
DP-2-1 604.42
A-3 585.76
SWS-2
A-2 587.15
DP-3-2 600.45
MW-4-1 582.17
BW-105 605.17
DP-3-1 598.82
BW-2 593.97
A-1 593.30
MW-4-2 587.57
B-1 592.68
SW-4 602.15
SW-104 619.76
B-4 599.63
B-3 597.66
B-2 595.31
SW-101 571.13
BW-3 567.62
SWS-3
PZ-1 567.38
MLW-1-4
BW-109 598.19
SW-109 <598.15
BW-110 578.20
SW-103 594.44
SW-102 579.35
SW-106 583.98
BW-106 592.42
605
600
595
590
585
580
575
570
LEGEND
MONITORING WELL
SURFACE WATER SAMPLE LOCATION
WATER TABLE ELEVATION CONTOUR (FT MSL)
GROUNDWATER FLOW DIRECTION
FAULT
FORMER DRUM DISPOSAL AREA OR LAGOON
NOTES
POSTED WATER TABLE ELEVATIONS ARE IN FEET
0
150
300
Feet
MEDLEY FARM NPL SITE
GAFFNEY, SOUTH CAROLINA
WATER TABLE CONFIGURATION
NOVEMBER 27, 2012
DRAWN BY: TLH
CHECKED BY: LMC
APPROVED BY: SWW
SCALE AS NOTED
PROJECT NO.: 200119.3.0
DATE: MAY 2013
FIGURE NO.: 5-1
TRC
Patewood Plaza One, Suite 300
30 Patewood Drive
Greenville, SC 29615-3535
Phone: 864-281-0030
FAX: 864-281-0288
Path: P:_COSTPT\03630\ArcGIS10\2012\WT_20121127_rev1.mxd
Date Saved: 5/30/2013 10:04:26 AM

Appendix F: Photographs from Site Inspection Visit

Photo Log for Site Inspection – Medley Farm Drum Dump
April 1, 2014

Photo 1 – Medley house from the gate

Photo 2 – MW 104D

Photo 3 – Facing southeast toward the SVE unit

Photo 4 – New water spigot for city water

Photo 5 – MW C2

Photo 6 – MW BW-301

Photo 7 – SVE unit (offline but still plumbed)

Photo 8 – Facing west towards the SVE wells

Photo 9 – SVE wells

Photo 10 – "B" line of recovery wells

Photo 11 – Facing west

Photo 12 – Facing west

Photo 13 – Second newly installed water spigot

Photo 14 – Facing northwest

Photo 15 – Injection equipment vault

Photo 16 – Multi-level well

Photo 17 – Equipment shed interior

Photo 18 – "A" line from entrance road facing north

Photo 19 – Water storage area

Photo 20 – A3 well facing northwest

Photo 21 – A5 well

Photo 22 – facing northwest

Photo 23 – Former Cattle pond ("A" line area)

Photo 24 – SW108 hinge moved

Photo 25 – SW108 hinge moved

Photo 26 –Facing downstream past SW/BW 108

Photo 27 – NPDES area; Jones Creek

Photo 28 – NPDES area; Jones Creek

Photo 29 – MW B3 was a water source with submersible pump

Photo 30 – Jones Creek

Photo 31 – Jones Creek

Photo 32 – BW4

Photo 33 – Camp area

Photo 34 – Jones Creek

Photo 35 – Hydraulic oil bucket near B4

Photo 36 – SW106 was open

Appendix G: Toxicity Values Summary

Summary of Toxicity Values					
COC	2012 AROD Values[1]		2014 Five Year Review Values		Has the Value Changed Since the 1991 ROD?
	Slope Factor (SF) $(mg/kg\text{-}day)^{-1}$	Oral Reference Dose (RfD) (mg/kg-day)	2014 SF $(mg/kg\text{-}day)^{-1}$	2014 RfD (mg/kg-day)	
Acetone	-	0.1	-	0.9	Yes
Methyl Ethyl Ketone (2-Butanone)	-	.05	-	0.6	Yes
Chloromethane	0.013	-	-	(a)	Yes
1,1-Dichloroethane	-	0.1	0.0057 (b)	0.2	Yes

1. The 2012 AROD cites the Baseline Risk Assessment and the 1991 ROD.
(a) The HEAST Oral Cancer Slope Factor has been withdrawn. A recalculation of risks was performed using the revised toxicity values currently recommended by EPA. IRIS recommends use of an RfC of 0.09 mg/m^3; this value was used to calculate the inhalation risk for this compound.
(b) Tier 3 value, California EPA.